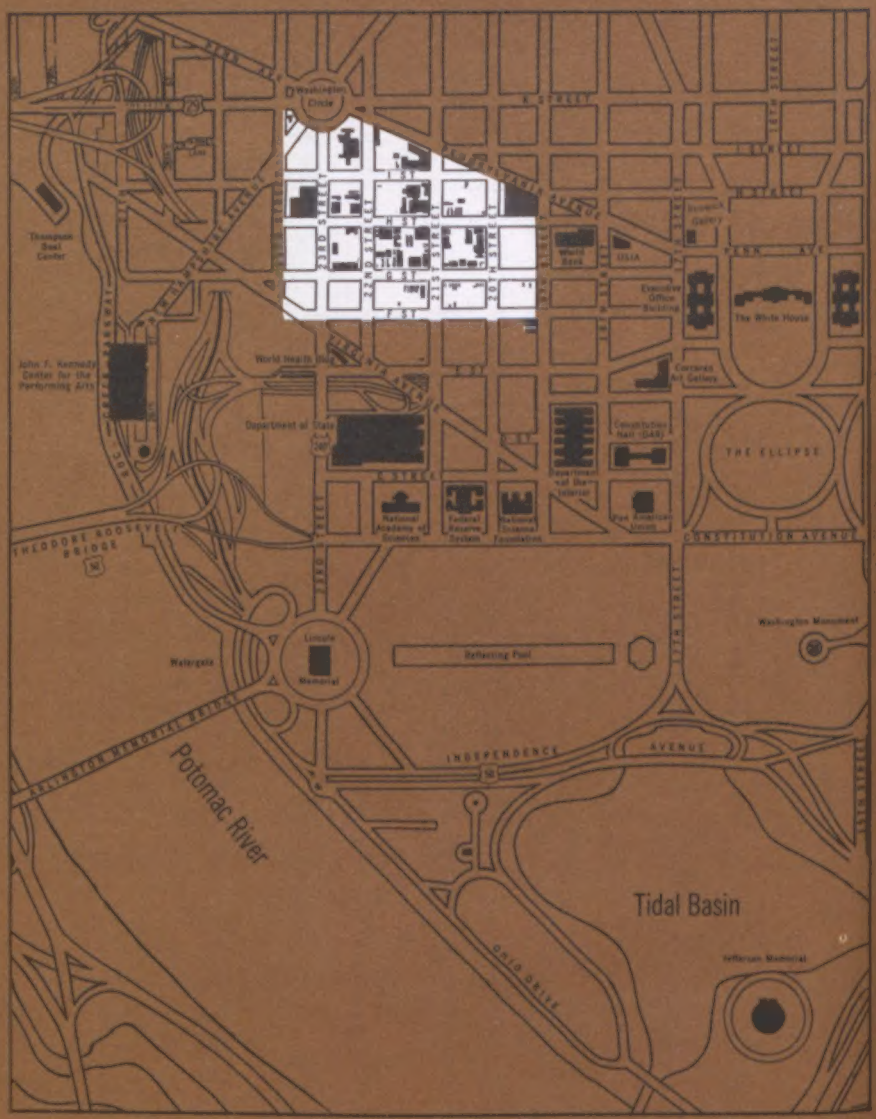
The George Washington University Bulletin

VOLUME LXXIV, NUMBER 6, MAY 1975



UNDERGRADUATE
AND
GRADUATE
CATALOGUE
1975-1976



THE GEORGE WASHINGTON UNIVERSITY CAMPUS/ WASHINGTON, D. C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
Volume LXXIV, Number 6, May 1975

Published by The University at Washington, D. C. 20052

MONTHLY: DECEMBER, JUNE
(2 ISSUES IN MAY, 3 ISSUES IN MARCH AND JULY)

Second Class Postage Paid at Washington, D. C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN

UNDERGRADUATE AND GRADUATE CATALOGUE 1975-76

Arts and Sciences, Education, Government and Business Administration, Public and International Affairs

This catalogue lists the programs and faculties of Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.

It also contains information on the Division of University Students, in which students may register for University courses for credit or as auditors without pursuing degree programs.

For information concerning the University's programs and faculties in Engineering and Applied Science, Law, and Medicine and Health Sciences request the appropriate catalogue.

Page

259 Chemistry
266 Classics
269 East Asian Languages and Literatures
272 Economics
280 Education
297 Education Policy—Graduate Study
298 English
308 Environmental Studies
309 Experimental Humanities
312 Forensic Sciences
317 Genetics—Graduate Study
319 Geography and Regional Science
324 Geology
330 Germanic Languages and Literatures
334 Health Care Administration
339 History
351 Honors Program—Columbian College
351 Human Ecology—Doctoral Study
351 Human Kinetics and Leisure Studies
360 Institute for Sino-Soviet Studies
362 International Relations—Doctoral Study
363 Journalism
366 Judaic Studies
367 Latin American Studies
367 Management Science
373 Mathematics
390 Microbiology
392 Music
399 Mycology—Graduate Study
399 Pathology
402 Pharmacology
405 Philosophy
408 Physics
414 Physiology
417 Political Science
430 Psychology
439 Public Administration
443 Public and International Affairs
444 Religion
450 Romance Languages and Literatures
460 Service-Learning Program
462 Slavic Languages and Literatures
467 Sociology
474 Special Education
479 Speech and Drama
488 Statistics
496 Urban and Regional Planning
499 Women Studies—Graduate Study
502 Faculty and Staff of Instruction
554 Appendix—Recently Established Regulations
558 Index

THE CALENDAR 1975-76*

1975

AUGUST

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SEPTEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

OCTOBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

NOVEMBER

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

1976

DECEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

JANUARY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

FEBRUARY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29						

MARCH

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

APRIL

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

MAY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

JUNE

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

JULY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

1975 FALL SEMESTER

August 25 Orientation for students from foreign countries *Monday*

August 26 Orientation, placement tests, and advising for entering freshmen who did not attend Summer Advance Registration Sessions *Tuesday*

August 27 Orientation, placement tests, and advising for transfer students *Wednesday*

†*August 28–30* Registration *Thursday-Saturday*
Application for February graduation due as part of registration

September 1 Labor Day (holiday) *Monday*

September 2 Classes begin *Tuesday*

September 3 University Faculty Assembly Meeting *Wednesday*

September 12 Faculty Senate Meeting *Friday*

September 21 Application for October Ed.D. Comprehensive Examinations due *Saturday*

October 3 School of Public and International Affairs Faculty Meeting *Friday*

*This calendar is subject to change.
†Registration is conducted alphabetically according to the first letter of the student's surname. The alphabetical breakdown and the hours of registration will be stated in the *Schedule of Classes*, which is available well in advance of each semester.

October 8	Columbian College of Arts and Sciences Faculty Meeti *Wednesday*
October 10	Faculty Senate Meeting *Friday*
October 15	Application for School of Public and Internation Affairs
	November Master's Comprehensive Examinations d *Wednesday*
October 16	Board of Trustees Meeting *Thursday*
October 18	Ed.D. Comprehensives *Saturday*
November 1	Deadline for submission of spring-semester financial a application *Saturday*
November 7	Application for December Ed.D., Ed.S., and M.A. Ed. Comprehensive Examinations due *Friday*
November 14	Faculty Senate Meeting *Friday*
November 8	National Teachers Examinations *Saturday*
November 14–15	School of Public and International Affairs Maste Comprehensive Examinations *Friday-Saturday*
November 21–22	School of Government and Business Administrati Master's Comprehensive Examinations *Friday-Saturda*
November 24	D.B.A., D.P.A., and Ph.D. Dissertations of Februa candidates due *Monday*
November 26	Thanksgiving recess begins after last class *Wednesday*
December 1	Classes resume *Monday*
December 2	Last day of fall-semester classes *Tuesday*
December 5	School of Public and International Affairs Facul Meeting *Friday*
December 6	Ed.D., Ed.S., and M.A. in Ed. Comprehensive Examin tions *Saturday*
December 8–17	Examination period *Monday-Wednesday*
December 12	Faculty Senate Meeting *Friday*
January 2	Master's Theses of February candidates due *Friday*
January 5	Columbian College of Arts and Sciences Faculty Mee ing *Monday*
January 5	Ed.D. Dissertations of February candidates due *Monday*
1976	**SPRING SEMESTER**
January 12	Orientation for students from foreign countries *Monday*
January 13–14	Orientation for new students; advising for all studen *Tuesday-Wednesday*
January 15	Board of Trustees Meeting *Thursday*
**January 15–17*	Registration *Thursday-Saturday*
	Application for May graduation due as part of registr tion.
January 19	Spring-semester classes begin *Monday*
January 23	Faculty Senate Meeting *Friday*
January 27	University Faculty Assembly Meeting *Tuesday*

* Registration is conducted alphabetically according to the first letter of the student's surname. Th alphabetical breakdown and the hours of registration will be stated in the *Schedule of Classes*, whi is available well in advance of each semester.

February 1	Deadline for submission of 1976-77 freshman financial aid applications *Sunday*
February 6	School of Public and International Affairs Faculty Meeting *Friday*
February 13	Faculty Senate Meeting *Friday*
February 16	Winter Convocation (holiday) *Monday*
February 27	Columbian College of Arts and Sciences Faculty Meeting *Friday*
March 1	Deadline for submission of 1976-77 continuing and transfer undergraduate financial aid application *Monday*
March 10	Application for School of Public and International Affairs April Master's Comprehensive Examinations due *Wednesday*
March 12	Faculty Senate Meeting *Friday*
March 13	Spring recess begins after last class *Saturday*
March 18	Board of Trustees Meeting *Thursday*
March 22	Classes resume *Monday*
March 22	Application for April Ed.D., Ed.S., and M.A. in Ed. Comprehensive Examinations due *Monday*
March 29	Ed.D. Dissertations of May candidates due *Monday*
March 30	D.B.A., D.P.A., and Ph.D. Dissertations of May candidates due *Tuesday*
April 1	Deadline for submission of 1976-77 graduate financial aid application *Thursday*
April 2	School of Public and International Affairs Faculty Meeting *Friday*
April 3	National Teacher Examinations *Saturday*
April 9	Faculty Senate Meeting *Friday*
April 16–17	School of Government and Business Administration and School of Public and International Affairs Master's Comprehensive Examinations *Friday-Saturday*
April 19	Master's Theses (other than those in the School of Public and International Affairs) of May candidates due *Monday*
April 23	Last day of spring-semester classes *Friday*
April 23	Master's Theses of May candidates in the School of Public and International Affairs due *Friday*
April 24	Ed.D., Ed.S., and M.A. in Ed. Comprehensive Examinations *Saturday*
April 28	Columbian College of Arts and Sciences Faculty Meeting *Wednesday*
April 29–May 8	Examination period *Thursday-Saturday*
May 1	Deadline for submission of Summer Sessions financial aid application *Saturday*
May 7	Faculty Senate Meeting *Friday*
May 9	Commencement *Sunday*
May 20	Board of Trustees Annual Meeting *Thursday*

FACTS ABOUT GEORGE WASHINGTON UNIVERSIT

General Information	Private, nonsectarian, coeducational, founded 1821
Location	Washington, D.C., bounded by Pennsylvania Avenue and 19th, F, and 24th Streets, N.W.
Number of Students	15,640 (9,643 men, 5,997 women)
Number of Undergraduates	5,155 (2,853 men, 2,302 women)
Geographical Origin of Students	50 states, District of Columbia, 110 countries
75-76 *19[redacted] Tuition*	Undergraduate: $2,500 for two semester graduate: $94 for each semester hour (se page 29)
Number of Full-time Faculty	922 (78% with Doctoral degrees)
Number of Part-time Faculty	350 (includes some of the most distinguished men and women in Washington who serve as professorial lecturers)
Residence Hall Space	1,919
Room and Board	Cost varies from $1,635 to $1,765 for th academic year (see page 57)

Undergraduate majors: Accounting, American Civilization, American Literature, Anthropology, Applied Mathematics, Applied Statistics, Art History, Biology, Botany, Business Administration, Cartography, Chemistry, Chinese Language and Literature, Civil Engineering, Classical Archaeology and Anthropology, Classical Archaeology and Classics, Classical Humanities, Computer Science, Dramatic Art, East Asian Studies (China and Japan), Economics, Electrical Engineering, Elementary Education, English Literature, Environmental Health, Environmental Studies, Fine Arts, French Language and Literature, Geodesy, Geography, Geology, Germanic Languages and Literatures, History, Human Kinetics and Leisure Studies, International Affairs, Journalism, Judaic Studies, Latin, Latin American Studies, Mathematical Statistics, Mathematics, Mechanical Engineering, Medical Technology, Music (Applied, History and Literature, Theory), Nurse Anesthetist Program, Nurse Practitioner Program, Oceanography, Philosophy, Physician's Assistant Program, Physics, Political Science, Premedicine, Psychology, Public Affairs, Radiologic Sciences and Administration, Religion, Russian Language and Literature, Russian Literature and Culture—in Translation, Secondary Education, Sociology, Spanish American Literature, Spanish Language and Literature, Speech Communication, Speech Pathology and Audiology, Urban Affairs, Zoology.

Study leading to graduate or professional degrees is offered in the Graduate School of Arts and Sciences, the National Law Center, the School of Medicine and Health Sciences, the School of Engineering and Applied Science, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.

THE UNIVERSITY

HISTORY

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company, "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that Government should incline to extend a fostering hand towards it." The Congress never extended a "fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical

School was located downtown. For the better part of the Columbian Univ sity period, the buildings of the University were situated along H Street betwe Thirteenth and Fifteenth Streets.

During the last half-century the University's present plant has been dev oped in that section of the old First Ward familiarly known as "Foggy Bottor between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Aven The area is not without its reminders of historic interest to the Universi President Monroe, who signed the Charter, lived at 2017 Eye Street. The fi President of the Board of Trustees, the Reverend Obadiah B. Brown, was fifty years the pastor of a church at Nineteenth and Eye Streets, and Washingt selected Twenty-third and E Streets as the site of the National University hoped to see established.

PURPOSE AND OBJECTIVES

The purpose of The George Washington University was to realize "the aspi tions of Washington, Jefferson, and Madison, for the erection of a univers at the seat of the Federal Government." Over the years it has been the aim develop the University ideal in the Nation's Capital with a view toward me ing the changing needs of society while continuing to pursue the traditio principles of learning and research.

The George Washington University now rededicates itself and all the sources at its command to the pursuit of knowledge and its dissemination. To this end:

The University recognizes its special opportunities in and obligations to o of the principal capitals of the world. It is a primary objective of the Univ sity to utilize its historical, geographical, and functional relationship to t Nation's Capital and the Washington community in continuing the develo ment of a great nationally and internationally oriented university.

The University recognizes the needs of our times and accepts the challen to develop each student's potential abilities to the fullest extent.

The University is and should remain privately controlled, nonsectarian, a co-educational.

Admission to the University is determined only in terms of the perso character and academic qualifications of the candidates.

A broadly based liberal education is fundamental to the total program the University.

Expansion of graduate and professional studies and research and the utili tion for this purpose of the excellent research facilities and materials availab in the Nation's Capital are basic to the continuous development of the Univ sity's educational program.

The provision of superior instruction and facilities and the application of hi standards of entrance qualifications and academic achievement to all stude whether full-time or part-time, on-campus or off-campus, are major missions the University.

A balanced program of student extracurricular activities is an integral part the University program.

The University will continue to strive to meet the evident needs of an larged student body while governing the size of enrollment by its capacity supply adequate staff and facilities for the excellent teaching and resea which it espouses.

THE COLLEGES, SCHOOLS, AND DIVISIONS

George Washington University includes 12 colleges, schools, and divisions, as follows:

*Columbian College of Arts and Sciences** offers four-year programs in the arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. The College also provides prelegal and premedical programs, and the preprofessional work required for admission to the School of Education and to the School of Public and International Affairs. Columbian College has academic jurisdiction over the off-campus programs leading to the degrees of Associate in Arts in General Studies, Bachelor of General Studies, Bachelor of Science in Geodetic and Cartographic Science, and Bachelor of Science in Oceanography. These off-campus programs are administered by the College of General Studies.

The Graduate School of Arts and Sciences† offers advanced study and research leading to the degrees of Master of Arts, Master of Arts in Special Studies, Master of Fine Arts, Master of Forensic Sciences, Master of Music, Master of Science, Master of Science in Forensic Science, Master of Science in Special Studies, Master of Science for Teachers, and Doctor of Philosophy. The degrees of Master of Arts in Special Studies and Master of Science in Special Studies are also available through off-campus programs administered by the College of General Studies.

*The School of Medicine and Health Sciences**† offers work leading to the degrees of Associate in Science, Bachelor of Science, and Doctor of Medicine.

The National Law Center‡ offers courses leading to the degrees of Juris Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (American Practice), and Doctor of Juridical Science; and special programs in Continuing Legal Education.

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: Civil Engineering, Electrical Engineering, and Mechanical Engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science. The School has academic jurisdiction over the off-campus programs leading to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science. These off-campus programs are administered by the College of General Studies.

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education and Bachelor of Science in Human Kinetics and Leisure Studies; graduate studies leading to the degrees of Master of Arts in Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education. The degree of Master of Arts in Education is also available through off-campus programs administered by the College of General Studies.

The School of Government and Business Administration offers undergraduate programs leading to the degrees of Bachelor of Business Administration and Bachelor of Science in Health Care Administration; graduate programs leading

* Columbian College of Arts and Sciences cooperates with the School of Medicine and Health Sciences in offering a program leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.
† The Graduate School of Arts and Sciences cooperates with the School of Medicine and Health Sciences in offering a program leading to the combined degrees of Master of Science and Doctor of Medicine and a dual program leading to the degrees of Doctor of Medicine and Doctor of Philosophy.
‡ The National Law Center cooperates with the School of Public and International Affairs in offering a program leading to the combined degrees of Juris Doctor and Master of Arts.

to the degrees of Master of Arts in Government, Master of Arts in Health Car Administration, Master of Business Administration, Master of Public Ad ministration, Master of Urban and Regional Planning; the Post-Master's Gradu ate Certificate in Health Care Administration; the degrees of Doctor of Busines Administration and Doctor of Public Administration. The School also ha academic jurisdiction over off-campus programs leading to the degrees o Bachelor of Science in Administration and Master of Science in Administration These off-campus programs are administered by the College of General Studies

The School of Public and International Affairs‡ offers undergraduate pro grams leading to the degree of Bachelor of Arts and graduate programs leadin to the degree of Master of Arts. The School also offers an off-campus progra leading to the degree of Master of Science in International Affairs.

The College of General Studies supplements the adult education program o the University through campus and off-campus study; conferences, seminar and special projects; and continuing education and noncredit programs. Th College also administers the off-campus programs over which Columbian Co lege of Arts and Sciences, the Graduate School of Arts and Sciences, the Schoo of Engineering and Applied Science, the School of Education, and the Schoo of Government and Business Administration have academic jurisdiction.

The Division of University Students makes available courses for students no candidates for degrees in this University.

The Division of Experimental Programs.

The Summer Sessions.

ACADEMIC STATUS

George Washington University is accredited by its regional accrediting agency the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of Un versity Women and is a member of the College Entrance Examination Board

The National Law Center is a charter member of the Association of Amer can Law Schools and is approved by the Section of Legal Education and Ad missions to the Bar of the American Bar Association. The School of Medicin and Health Sciences is a member of the Association of American Medical Co leges and is one of the medical colleges which have been continuously approve by the American Medical Association. Curricula of the School of Engineerin and Applied Science in Civil, Electrical, and Mechanical Engineering ar accredited by the Engineers' Council for Professional Development. The Schoo of Education is a charter member of the American Association of Colleges fo Teacher Education and is accredited by the National Council for Accreditatio of Teacher Education for its Bachelor's and Master's degree programs. Th School of Government and Business Administration has maintained full mem bership in the Middle Atlantic Association of Colleges of Business Administra tion since 1961. It joined the Council on Graduate Education for Public Ad ministration in 1966. In 1968, the School became a member of the Americar Assembly of Collegiate Schools of Business. The programs in Public Accountin designed to prepare students for Certified Public Accountants examination have been approved by the state boards of New York and of Maryland. Th program in Hospital Administration is accredited by the National Accreditin Commission on Graduate Education for Hospital Administration. The Depar ment of Chemistry is on the approved list of the American Chemical Society

The graduate program in clinical psychology in the Department of Psychology is on the approved list of the American Psychological Association. The program in speech pathology and audiology is accredited by the Education and Training Board of the American Boards of Examiners in Speech Pathology and Audiology

LOCATION

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the United States Information Agency, the Corcoran Gallery of Art, the Department of State, the Department of the Interior, the General Services Administration, the National Academy of Sciences, and the John F. Kennedy Center for the Performing Arts.

GOVERNMENT

The University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the President of the University is an ex officio member. The members of the Board are named for a period of three years and are divided into three classes. The members of one class are elected at each annual meeting to fill the places of the members whose terms of office expire. Two members of each class are nominated by the Alumni Association.

THE UNIVERSITY LIBRARIES

The Library collections of the University are housed in the University Library, the general library of the University, and in the libraries of the Institute for Sino-Soviet Studies, the National Law Center, and the School of Medicine and Health Sciences.

These collections contain approximately 632,240 volumes, to which are added some 35,000 volumes a year. Endowments supplementing the University appropriation provide books in the fields of American civilization, American literature, foreign service, history, public finance, and the social sciences; and gifts from many sources have enriched the collections. The Libraries currently receive about 6,895 periodicals.

Information concerning the use of the Libraries may be obtained at the Library service desks.

The Library is administered for the curricular, reference, and recreational needs and interests of the students. Instruction in the use of the library is given upon request by the reference librarians. The Library endeavors to assist students and all members of the University to use the rich library resources of Washington and the unusual opportunities they offer for extensive research. Interlibrary loan arrangements are maintained with other libraries in the city and throughout the United States.

The student has access to the Library of Congress, the Public Library of the District of Columbia and its branches, and many of the great special collections of the government departments. Graduate students at George Washington University may, upon application, be issued a Consortium library card which permits direct borrowing from the libraries of the other Consortium institutions.

THE BOARD OF TRUSTEES OF THE UNIVERSITY

The President of the University is an ex officio member of the Board of Tru
tees.

E.K. Morris, LL.D., D.P.S., *Chairman Emeritus*

Charles E. Phillips, LL.B., LL.M., *Chairman*
*Everett H. Bellows, M.A., *Vice Chairman*
James M. Mitchell, M.A., *Secretary*
*Thaddeus A. Lindner, B.A. in Govt., *Assistant Secretary*

TERM ENDING 1975

Mortimer M. Caplin, B.S., LL.B., J.S.D., LL.D.
Henry C. Clausen, J.D.
Frank G. Dickey, M.A., Ed.D., LL.D., D.Lit., L.H.D.
John B. Duncan, B.A., LL.B., LL.D.
Melville B. Grosvenor, B.S., Sc.D., LL.D.
Joseph H. Hirshhorn
*Sidney A. Levine, B.A., M.D.
*Thaddeus A. Lindner, B.A. in Govt.
Jeremiah Milbank, B.A., M.B.A.
James M. Mitchell, M.A.
S. Dillon Ripley II, Ph.D., L.H.D., Sc.D.
Orville F. Rush, J.D., LL.D.
Charles E. Smith
James O. Wright, B.S., J.D.

TERM ENDING 1976

Robert C. Baker, LL.D.
Joel Barlow, B.A., J.D., LL.D.
*Everett H. Bellows, M.A.
George M. Bunker, B.S.
George A. Butler, LL.B.
Leon Chatelain, Jr.
Donald C. Cook, B.A., M.B.A., J.D., LL.M., L.H.D., LL.D.
*Joseph B. Danzansky, B.A., J.D.
Nancy B. Dudley, B.A. in Govt.
Joseph D. Hughes, B.S., J.D., LL.M., LL.D.
David M. Kennedy, LL.B., M.A., LL.D.
Franklin J. Lunding, LL.B., LL.D.
Charles E. Phillips, LL.B., LL.M.
John W. Thompson, Jr., B.A.
Watson W. Wise, Ph.B.

* Alumni trustee.

TERM ENDING 1977

Jacob Burns, LL.B., LL.D.
Jacqueline Cochran, L.H.D., LL.D., Sc.D.
Katharine Graham, B.A.
L.A. Jennings
Donald W. Nyrop, B.A., LL.B.
Thornton W. Owen, B.S. in C.E., B.A.
Flaxie M. Pinkett, B.A.
*Abe Pollin, B.A. in Govt.
Carleton D. Smith
Douglas R. Smith, B.S.C.
Mark Sullivan, Jr., B.A.
William G. White, B.S. in C.E.
John J. Wilson, LL.B.
Stephen R. Woodzell, B.S. in E.E.
*Joseph S. Wright, LL.B., LL.D.

HONORARY TRUSTEES

Walter M. Bastian, LL.B., LL.D.
Harry F. Duncan
Newell W. Ellison, B.A., LL.B., LL.D.
Charles C. Glover, Jr., M.A., LL.B., LL.D.
Brooks Hays, B.A., J.D., LL.D., L.H.D., D.C.L., D.D., HH.D.
Alfred H. Lawson, LL.B., LL.D.
John K. McKee
Benjamin M. McKelway, Litt.D.
E.K. Morris, LL.D., D.P.S.
Godfrey L. Munter, B.A., LL.B., LL.D.
Alexander Wetmore, Ph.D., Sc.D.
Lloyd B. Wilson

STANDING COMMITTEES OF THE BOARD OF TRUSTEES

The Chairman of the Board of Trustees and the President of the University are ex officio members of each committee of the Board.

EXECUTIVE COMMITTEE

C.E. Phillips (*Chairman*), E.H. Bellows (*Vice Chairman*), George M. Bunker, Frank G. Dickey, J.B. Duncan, L.A. Jennings, C.D. Smith, C.E. Smith, J.J. Wilson, President Lloyd H. Elliott (*ex officio*)

COMMITTEE ON ACADEMIC AFFAIRS

Frank G. Dickey (*Chairman*), Jeremiah Milbank, Jr. (*Vice Chairman*), Joel Barlow, D.C. Cook, M.B. Grosvenor, S.D. Ripley II, O.F. Rush, W.G. White, Reuben E. Wood (*Faculty Member*), Robert S. Peck (*Student Member*)

* Alumni trustee.

COMMITTEE ON FINANCIAL AFFAIRS

J.J. Wilson (*Chairman*), T.W. Owen (*Vice Chairman*), R.C. Baker, Le
Chatelain, Jr., J.H. Hirshhorn, D.M. Kennedy, Flaxie Pinkett, J.W. Thompso
Jr.

COMMITTEE ON STUDENT AFFAIRS

J.B. Duncan (*Chairman*), J.D. Hughes (*Vice Chairman*), E.H. Bellows, Jac
Burns, Nancy Dudley, D.R. Smith, J.O. Wright, Diane Brewer (*Faculty Me
ber*), R.A. Chlopak (*Student Member*)

COMMITTEE ON UNIVERSITY DEVELOPMENT

C.E. Smith (*Chairman*), L.A. Jennings (*Vice Chairman*), G.A. Butler, H.
Clausen, Jacqueline Cochran, J.B. Danzansky, S.A. Levine, T.A. Lindne
F.J. Lunding, Abe Pollin, W.W. Wise

COMMITTEE ON UNIVERSITY TRUSTEESHIP

C.D. Smith (*Chairman*), G.M. Bunker (*Vice Chairman*), M.M. Caplin, Kath
rine Graham, D.W. Nyrop, Mark Sullivan, Jr., S.R. Woodzell, J.S. Wright

OFFICERS OF ADMINISTRATION*

THE UNIVERSITY

Lloyd Hartman Elliott, M.A., Ed.D., LL.D., *President*
Phillip Donald Grub, D.B.A., *Special Assistant to the President for Interna
tional Programs*
Henry William Herzog, B.S., *Special Assistant to the President*
Harold Frederick Bright, Ph.D., *Provost and Vice President for Academ
Affairs*
Carl James Lange, Ph.D., *Assistant Vice President for Research*
Carl Hugo Walther, M.C.E., Ph.D., *Assistant Vice President for Academ
Affairs*
Seymour Alpert, B.A., M.D., *Vice President for Development*
H. John Cantini, Jr., J.D., *Vice President for Administration*
John Herbert Strandquist, B.A., *Assistant Vice President for Administration*
Charles Edward Diehl, B.Arch.Engr., B.C.E., M.B.A., *Vice President an
Treasurer*
Maurice Kingsley Heartfield, Jr., B.A., *Assistant Vice President and Assis
ant Treasurer*
Margaret Payne Greene, B.S., *Assistant Treasurer, Sponsored Programs*
John Collum Einbinder, B.A. in Govt., *Director of Business Affairs*
James Joseph Feffer, B.A., M.D., *Vice President for Medical Affairs*
William David Johnson, B.S., *Director of Planning and Budgeting*

* The President of the University, the Vice President for Academic Affairs, the Registrar of th
University, the Director of Admissions of the University, and the University Librarian are ex offic
members of all faculties of the colleges and schools of the University.

Louis Harkey Mayo, B.S., J.S.D., *Vice President for Policy Studies and Special Projects*
Frederick Justin Naramore, B.S., C.P.A., *Comptroller*
Neal Barnett Berryman, B.B.A., *Assistant Comptroller*
William Parkhurst Smith, Jr., B.A., M.B.A., M.A. in Ed., *Vice President for Student Affairs*

Boris Constant Bell, M.S. in P.E., *Director of the Cloyd Heck Marvin Center*
Ray Clements, Ph.D., *Adviser to International Students*
Robert Faris, B.S., *Director of Athletics*
Sal Fiscina, M.D., *Director of the Student Health Service*
Tomi Flory, *Director of Personnel Services*
Robert Gebhardtsbauer, B.A., M.A., *Registrar*
Robert Gean Jones, B.D., Ph.D., *University Marshal*
Elmer Louis Kayser, Ph.D., LL.D., *University Historian*
Marianne Ruth Phelps, M.S., M.A., M.Phil., *Dean of Students*
Joseph Young Ruth, B.A., *Director of Admissions*
Ellwood Anthony Smith, B.S. in Ed., *Director of Alumni Relations*
John Roland Wilson, M.A., *Director of Public Relations*
Rupert Woodward, B.S., B.S. in L.S., M.A., *University Librarian*

THE COLLEGES, SCHOOLS, AND DIVISIONS

Calvin Darlington Linton, Ph.D., *Dean of Columbian College of Arts and Sciences*
Henry Solomon, Ph.D., *Dean of the Graduate School of Arts and Sciences*
Philip Stanley Birnbaum, M.S. in M.E., B.C.E., *Dean for Administrative Affairs of the Medical Center*
Ronald Paul Kaufman, B.S., M.D., *Dean for Clinical Affairs of the Medical Center; Medical Director of the University Hospital*
John Patrick Naughton, B.S., M.D., *Dean for Academic Affairs of the Medical Center*
Robert Kramer, B.A., LL.B., *Dean of the National Law Center*
Harold Liebowitz, D.Ae.E., *Dean of the School of Engineering and Applied Science*
Rodney Tillman, Ed.D., *Dean of the School of Education*
Peter B. Vaill, B.A., D.B.A., *Dean of the School of Government and Business Administration*
Burton Malcolm Sapin, Ph.D., *Dean of the School of Public and International Affairs*
John Gage Allee, Jr., Ph.D., *Dean of the Division of University Students*
Robert Lee Holland, Ph.D., *Dean of the College of General Studies*
William Francis Edward Long, Ph.D., *Dean of the Summer Sessions*
Clarence Cowan Mondale, Ph.D., *Director of the Division of Experimental Programs*
Lawrence Thompson Bowles, M.D., Ph.D., *Associate Dean for Curricular and Student Affairs of the Medical Center*
Fred Leonard, Ph.D., *Associate Dean for Research of the Medical Center*
Michael McCally, M.D., Ph.D., *Associate Dean for Allied Health Programs of the Medical Center*

Dennis Sophian O'Leary, B.A., M.D., *Associate Dean for Professional Servic of the Medical Center*
W. Wallace Kirkpatrick, B.A., LL.B., *Associate Dean of the National La Center*
Edward Andrew Potts, B.A., LL.B., *Associate Dean of the National Law Ce ter, for Graduate Studies, Research, and Projects*
Salvatore Frank Divita, B.I.E., D.B.A., *Associate Dean for External Affairs the School of Government and Business Administration*
Harry Robert Page, Ph.D., *Associate Dean of the School of Government an Business Administration*
Charles McKay Chambers, Ph.D., *Associate Dean of the College of Gener Studies, for Planning and Development*
Alvin Carl Jensen, Ed.D., *Associate Dean of the College of General Studies*
Calvin Trexler Klopp, B.A., M.D., *Medical Director of the University Clinic*
Barbara Joan Dunham, M.A., *Assistant Dean of Columbian College of Ar and Sciences*
Joseph Louis Métivier, Jr., M.A., *Assistant Dean of Columbian College of Ar and Sciences*
Robert Clinton Rutledge, Ph.D., *Assistant Dean of Columbian College of Ar and Sciences*
Harry Elwood Yeide, Jr., Ph.D., *Assistant Dean of Columbian College of Ar and Sciences*
Edward Alan Caress, Ph.D., *Assistant Dean of the Graduate School of Ar and Sciences*
David Alton Rowley, Ph.D., *Assistant Dean of the Graduate School of Ar and Sciences*
Margaret Gallagher, B.S.N., M.A., *Assistant Dean for Nursing Services and Director of Nursing of the Medical Center*
Robert Keimowitz, M.S., M.D., *Assistant Dean for Admissions and Director o Admissions (M.D. Program) of the Medical Center*
Winfield Harker Scott, Ph.D., *Assistant Dean for Education and Director of Education of the Medical Center*
James Elmer Feir, Ph.D., *Acting Assistant Dean of the School of Engineering and Applied Science*
Robert Edward Baker, M.A., Ed.D., *Assistant Dean of the School of Education*
John Lobuts, Jr., B.S., Ed.D., *Assistant Dean of the School of Government and Business Administration*
Bjorn Karsten Netland, M.A., *Assistant Dean of the Division of University Students*
Ruth H. Osborn, Ed.D., *Assistant Dean of the College of General Studies, for Continuing Education for Women*

COMMITTEES OF THE UNIVERSITY 1974-75

COMMITTEE ON FEDERAL EDUCATIONAL ALLOWANCES

Henry Solomon (*Chairman*), H.F. Bright, C.D. Linton, C.H. Walther, L.H. Elliott (*ex officio*)

COMMITTEE ON RESEARCH

Henry Solomon (*Chairman*), J.T. Bennett, H.F. Bright, Julian Eisenstein, A.M. Freudenthal, C.J. Lange, Fred Leonard, Martha Rashid, D.G. White

COMMITTEE ON RESEARCH ON HUMANS

C.J. Lange (*Chairman*), I.H. Cisin, J.W. Hillis, B.I. Levy, A.E. Parrish, Martha Rashid

COMMITTEE ON RELIGIOUS LIFE

R.G. Jones (*Chairman*), J.G. Boswell, R.H. Davison, L.P. Leite, H.M. Sachar, Five Student Members

COMMITTEE ON SPONSORED RESEARCH

A.W. Reitze (*Chairman*), W.K. Kahn, N.C. Kramer, B.I. Levy, J.B. Levy, G.W. Smith, C.J. Lange (*ex officio*), Fred Leonard (*ex officio*), Six Student Members

COMMITTEE ON THE UNIVERSITY BOOKSTORE

Edwin Timbers (*Chairman*), Chei-Min Paik, S.R. Paratore, Monroe Hurwitz (*ex officio*), Randolph Munt (*ex officio*), Three Student Members

COMMITTEE ON JUDICIAL SYSTEM

L.H. Harris (*Chairman*), Linda DePauw, F.C. Kurtz, Three Student Members

COMMITTEE ON STUDENT PUBLICATIONS

A.E. Claeyssens, Jr. (*Chairman*), S.W. Burks, A.J. Mastro, Philip Robbins, W.E. Schmidt, Robert Berendt (*ex officio*), F.J. Naramore (*ex officio*), D.C. Speck (*ex officio*), H.E. Yeide, Jr., Six Student Members

STUDENT-FACULTY COMMITTEE ON APPEALS

Elyce Ferster (*Chairman*), N.K. Khatcheressian, J.P. Reesing, Jr., C.T. Stewart, Jr., Four Student Members

COMMITTEE ON UNIVERSITY PARKING

J.C. Einbinder (*Chairman*), V.H. Cohn, Jr., C.R. Naeser, D.C. Novak, Carol St. Cyr, D.C. Speck, J.H. Strandquist, C.H. Walther, C.E. Diehl (*ex officio*), Joseph Mello (*ex officio*), Randolph Munt (*ex officio*), Four Student Members

COMMITTEE ON ANIMAL FACILITIES

W.L. Joseph (*Chairman*), W.P. Fortune, Kun-Yen Huang, M.J. Jackson, L.V Thompson, R.D. Walk, B.C. Zook, C.J. Lange (*ex officio*), Fred Leonard (*officio*)

THE FACULTY SENATE 1975-76

Elizabeth Byrne Adams
Jeffrey Marshall Albert
John Gordon Boswell
*Harold Frederick Bright
Marie Mullaney Cassidy
Raymond Sheary Cottrell, Jr.
Charles Fox Elliott
*Lloyd Hartman Elliott
*James Joseph Feffer
Raymond Richard Fox
*Robert Gebhardtsbauer
William Byron Griffith
Phillip Donald Grub
Arthur David Kirsch
Norman Clifford Kramer
*Robert Kramer
Frederick Charles Kurtz
*Harold Liebowitz
Hubert Whitman Lilliefors
*Calvin Darlington Linton
Arnold Charles Meltzer
†John Andrew Morgan, Jr.
Charles Rudolph Naeser
Ralph Clarke Nash, Jr.
Howard Clemeth Pierpont
Bernard Reich
*Burton Malcolm Sapin
Stefan Otto Schiff
William Edward Schmidt
Joseph Borden Smith, Jr.
*Henry Solomon
Russell Bennett Stevenson, Jr.
*Rodney Tillman
*Peter B. Vaill
Clemmont Eyvind Vontress
Ruth Ann Wallace
Reuben Esselstyn Wood

Teresa Moran Schwartz, *Parliamentarian*

* Ex officio member
† Chairman of the Executive Committee

GENERAL INFORMATION

Admission

THE UNIVERSITY ACCEPTS BOTH MEN AND WOMEN. Students are admitted at the beginning of each semester and summer session.

The right is reserved to refuse admission to any student with an academic record which creates doubt of his ability to succeed in college or who, for any other reason, would not be an acceptable student. In the selection process, there is no discrimination because of sex, race, color, creed, or national origin.

An application for admission to degree candidacy should be accompanied by a $10 (for undergraduate study) or $25 (for graduate study) application fee.* The application fee is waived for graduates of this University applying to the Graduate School of Arts and Sciences, and for students applying for readmission who were registered as degree candidates at the time of their last registration at this University and who have not since registered at another institution.

Applicants are urged to submit the application form and complete credentials well in advance of the semester for which they seek admission.

UNDERGRADUATE ADMISSION†

Forms for application for admission or readmission are available at and should be returned to the Office of Admissions, George Washington University, Washington, D.C. 20052.

SECONDARY SCHOOL STUDENTS

Applicants who wish to begin college in the fall semester or in either the first or second term of the summer session should apply during the fall term of the senior year in high school. Preference will be given to students who submit applications and required credentials prior to March 1. Students graduating at mid-year who wish to begin college in the spring semester should apply no later than December 1.

* Application fee must be by check or postal money order, payable to George Washington University.
† For detailed admission requirements, see the appropriate college or school in this Catalogue. Tests required for admission and Educational Testing Service information are described on pages 71-72 and 137. See pages 26-27 for admission requirements for students from foreign institutions.

Although decisions on most applications for the fall semester will requ submission of seventh-term grades and senior-year test scores, an earlier d cision will be given after September 1 to a student whose application becom complete with a secondary school record through the junior year and junio year test scores, provided these records clearly establish admissibility.

Early Admission Plan.—Unusually well-prepared students who have co pleted the junior year in high school may be considered for admission. Th plan is designed for those students who, in terms of academic preparation a emotional maturity, are ready to enter college. More often than not, t student interested in early admission has substantially exhausted the hig school offerings in several academic areas. For such students, remaining high school for a senior year would not be in his or her best interest, nor the interest of the school.

To be considered for early admission, the student must:

1. meet most of the secondary school requirements for graduation a complete the University's required entrance units (see pages 71–72 and 137
2. have the unqualified recommendation of the secondary school princip or counselor.
3. submit two letters of recommendation (in addition to the counselor's from teachers who can testify to the student's maturity and general readines to enter college.
4. submit SAT and three achievement test scores or ACT scores.

The student's chances for admission will be improved if he submits CEE achievement tests in subjects taken in the sophomore year.

Inquiries should specifically mention interest in the Early Admission Plan.

An applicant from a secondary school must arrange to have sent directl from his school to the Office of Admissions a complete academic record to gether with a personal evaluation and recommendation from his principal. Th information should be supplied on a standard form used by the secondar school.

TRANSFER STUDENTS

Undergraduate transfer students from other institutions should submit applic tion and required credentials prior to June 1 for the fall semester, December for the spring semester, May 1 for the first summer session, and June 1 for th second summer session.

The transfer student must be in good standing as to scholarship and conduct He must be eligible to return to the last previously attended institution in th semester for which he seeks admission to this University. A student who ha been academically dismissed or suspended more than one time will not normall be considered for admission.

An applicant who has attended one or more institutions of higher learning must request *each* registrar to mail directly *to the Office of Admissions* a tran script of his record, *even though credits were not earned.*

If an applicant has fewer than 30 semester hours of acceptable work (*C* o better on academic work from an accredited institution) at the time the applica tion is submitted, he must request that his high school record and College Entrance Examination Board test scores be sent to the Office of Admissions.

If high school units are not shown on the college transcript, the applicant must request that his high school record be sent to the Office of Admissions.

ADVANCED TUITION DEPOSIT

After notification of acceptance, a $100 advanced tuition deposit will be required of all full-time undergraduate students including those readmitted. The deposit is credited toward tuition and is not refundable.

ADVANCED STANDING AND ADVANCED PLACEMENT

CREDIT FROM HIGHER INSTITUTIONS

Where there is no duplication involved either through course work or examination, advanced standing may be granted for work successfully completed at accredited institutions of higher learning. It will be granted only when it meets the requirements for the degree sought at this University and may be allowed provisionally. Work of low pass grade (*D* or the equivalent) will not be considered for transfer.

Except for students transferring to the School of Government and Business Administration from a two-year or junior college in which case no more than 60 semester hours credit may be assigned, there is no strict limit to the total amount of credit that may be assigned. However, a student must satisfy the residence and course requirements for the degree sought at George Washington University.

CREDIT BY EXAMINATION

Assuming there is no duplication of course work earned, a maximum of 30 semester hours of credit may be assigned upon admission to the University for each or any combination of the following:

COLLEGE ENTRANCE EXAMINATION BOARD ADVANCED PLACEMENT TESTS (APT)

Credit is assigned for examinations passed with scores of 4 or 5 on the basis of a score report sent to the Office of Admissions from the Educational Testing Service at the student's request. Examinations passed with scores of 3 will be considered for credit or placement if the student arranges to have the examination paper sent to the Office of Admissions. The Advanced Placement Tests are administered in the secondary school in May of each year. Normally only students who complete a course designated as Advanced Placement are prepared for the examination. Arrangements for the examination are the responsibility of the applicant and should be made with the Program Director, College Entrance Examination Board Advanced Placement Examinations, Box 592, Princeton, N.J. 08540, or Box 1025, Berkeley, Calif. 94701.

COLLEGE ENTRANCE EXAMINATION BOARD COLLEGE-LEVEL EXAMINATION PROGRAM (CLEP)

(CLEP offers two types of examinations: General and Subject Examinations. CLEP General Examinations are offered in five areas: mathematics, social sciences, humanities, natural sciences, and English composition. CLEP Subject Examinations measure achievement of specific college-level courses and are offered in more than 20 subjects.)

Upon admission to degree candidacy, credit is assigned for the General

Examinations, with the exception of the English composition examinatio passed at the 50th percentile or above (college sophomore norms). Credit assigned for the Subject Examinations passed at the level recommended in t College Board model policy. Credit may not be earned by passing the exam nation after having taken the equivalent course. Arrangements for the exam nations are the responsibility of the applicant and should be made with th College Entrance Examination Board College-Level Examination Progra Box 592, Princeton, N.J. 08540.*

COLUMBIAN COLLEGE OF ARTS AND SCIENCES SPECIAL DEPARTMENTAL EXAMINATIONS

See pages 78–79, *Earning Credit or Waiving Requirements by Examination.*

CREDIT EARNED THROUGH UNITED STATES ARMED FORCES INSTITUTE (USAFI)

Except for those students enrolled as candidates for the Bachelor of Busines Administration degree, credit is assigned for approved United States Arme Forces Institute college-level examinations passed with satisfactory scores.

CREDIT FROM SERVICE SCHOOLS

A limited amount of credit may be assigned for selected service school in struction received since 1941. No more than 30 semester hours may be assigned for a combination of service schools and examinations referred to above Veterans should submit to the Office of Admissions photostatic copies of their service school records, indicating courses successfully completed with sufficient identification of the course to locate it in the *Guide to Evaluation of Educa tional Experience in the Armed Forces.*

ADVANCED PLACEMENT

Advanced placement or waiver of a requirement will be granted on the basis o scores on Achievement Tests of the College Entrance Examination Board a follows:

Achievement Test	Minimum Score	Exemption
English Composition	650	Waives Engl 10
English Composition	680	Waives Engl 11 or 12
European and/or American History	600	Waives Hist 39-40 and/or 71-72
French	650	Waives Hist 39-40 requirement
German	600	
Hebrew	600	
Latin	600	
Russian	700	
Spanish	650	

* See page 140 for additional qualifications for applicants to the School of Government and Business Administration.

RADUATE ADMISSION*

Graduate School of Arts and Sciences.—Forms for application for admission readmission are available at the Office of the Dean of the Graduate School Arts and Sciences, George Washington University, Washington, D.C. 20052. ompleted applications and requests for fellowship support must be submitted y February 15 (February 1 for students in Clinical Psychology and Art herapy) for admission in the fall semester and by November 1 for the spring emester. Applications for graduate study are acceptable after these dates for dmission in the corresponding semester and will be reviewed if time permits nd if space is available in the program desired.

School of Education.—Forms for application for admission or readmission re available at the Office of the Dean of the School of Education, George Vashington University, Washington, D.C. 20052. When completed, these ap- lication forms should be submitted to this Office no later than June 1 for the all semester, November 1 for the spring semester, April 1 for the summer ses- ions.

School of Government and Business Administration.—Forms for application or admission or readmission are available at the Office of the Admissions Offi- er, School of Government and Business Administration, George Washington Jniversity, Washington, D.C. 20052. When completed, application forms or Master's degree programs should be submitted to this Office no later than une 1 for the fall semester, November 1 for the spring semester, April 1 for the irst summer session, and May 1 for the second summer session; those for doc- oral programs should be submitted by June 1 for the fall semester, October 1 or the spring semester, and April 1 for both summer sessions. Applicants for ither the master's or the doctoral program who received their undergraduate legrees from foreign universities must submit their applications according to the bove schedule for doctoral applicants.

School of Public and International Affairs.—Forms for application for ad- nission or readmission are available at the Graduate Admissions Office, School of Public and International Affairs, George Washington University, Washing- on, D.C. 20052. When completed, these application forms should be submit- ed to this Office no later than March 1 (February 1 for applicants for graduate ssistantships and foreign applicants). Admission is for the fall semester only. All credentials, including transcripts from all institutions attended, Graduate Record Examination scores, and letters of reference, must be received before he deadline date.

DIVISION OF UNIVERSITY STUDENTS ADMISSION†

Forms for application for admission to *nondegree* status in the Division of University Students are available at and should be returned to the Office of Admissions, George Washington University, Washington, D.C. 20052. When completed, these application forms, with credentials when required, should be received by the Office of Admissions no later than the Friday before the first

* For detailed admission requirements, see the appropriate college or school in this Catalogue. See pages 26-27 for admission requirements for students from foreign institutions.
† See pages 26-27 for admissions requirements for students from foreign institutions.

day of registration (see Calendar, pages 5–7). To avoid paying a late regi tion fee, every effort should be made to insure that all required credentials in the Office of Admissions prior to registration. No application fee is cha to process an application for admission to this Division. For detailed entra requirements, see pages 182–83.

Registration in a given course may be denied students in this Division w space is needed for degree candidates.

READMISSI

A student previously registered in the University who was not registered campus during the immediately preceding semester (summer session exclude must apply for readmission. Final dates for applying are the same as those "Undergraduate Admission" (see pages 21–24), or "Graduate Admission" (page 25). If the student applies as a degree candidate and was previou registered as a nondegree student, or if he has attended one or more hig institutions during his absence from the University, he must have compl official transcripts sent to the appropriate office at this University from e institution attended. Applications for readmission are considered on the ba of regulations currently effective.

The application fee is waived for a student applying for readmission w was registered as a degree candidate at the time of his last registration at t University and who has not since registered at another institution.

STUDENTS FROM FOREIGN INSTITUTIONS*

Application, required records, and scores on the *Test of English as a Forei Language* (see page 27) must be received from *foreign applicants* no later th March 1 (February 1 for applicants for graduate study in the School of Pub and International Affairs) for the fall semester and November 1 for the spri semester.

George Washington University offers a limited English-language progra for foreign students. Since it is not a full-time program of study, a stude must have sufficient knowledge of the English language to take at le one academic course, along with the English-language program, and to quali for an Application for a Student Visa (I-20) from this University.

To evaluate the student's preparation, the *Test of English as a Forei Language* must be taken according to the instructions given on page 27 und *Language Tests*. A student is given a placement test by George Washingto University English department upon arrival at the University. If the knowledg of English is inadequate to enable the student to undertake any academi work, the student will not be permitted to register and will be required t study English on a full-time basis at a language school offering an intensi English-language program.

* For detailed admission requirements, see the appropriate college or school in this Catalogue. Te required for admission and Educational Testing Service information are described on pages 71- 137, and 182-83.

REQUIRED RECORDS

Applicants must request all educational institutions attended to send *directly* to the appropriate office (see "Undergraduate Admission," pages 21–24, or "Graduate Admission," page 25), official credentials listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from secondary schools and all colleges and universities attended are required. Records of state examinations and certificates are also needed. All records become the property of the University and *cannot* be returned.

LANGUAGE TESTS

Students whose native tongue is not English are required to take the *Test of English as a Foreign Language* (TOEFL). Students are responsible for making arrangements for taking the test by addressing inquiries to the following agencies:

1. All European countries (including Cyprus, Great Britain, Iceland, and Ireland):

   CITO
   Postbus 1034
   Arnhem, Netherlands

2. All Middle Eastern and North African countries (except Israel):

   American Friends of the Middle East
   Abou Shakra Building
   Rue Bliss (Manara)
   Beirut, 2500 Lebanon

3. Hong Kong:

   Institute of International Education
   408 J. Hotung House, Fourth Floor
   5/15 Hankow Road, Kowloon, Hong Kong

4. India:

   Bureau of Educational Research
   Ewing Christian College
   Allahabad, U.P., 211003, India

5. Republic of China:

   Language Center, 2-1 Hsu-chow Road
   Taipei, Taiwan (100), Republic of China

All other applicants should address inquiries to TOEFL, Educational Testing Service, Princeton, N.J. 08540, U.S.A. The completed application form should be returned to the appropriate agency well in advance of the beginning of the semester for which the applicant seeks admission. The test fee remitted with the application entitles the student to have the test score sent to three different institutions. Registration for the *Test of English as a Foreign Language* does not constitute application for admission to George Washington University.

The Bulletin of Information, obtainable without charge, contains a des
tion of the test as well as rules regarding application, fees, reports, and
conduct of the test; lists of examination centers; examination dates; an
application blank. On the application for the test, the student should sp
that the scores be sent to the appropriate office at this University (see "U
graduate Admission," pages 21–24, or "Graduate Admission," page 25).

In addition to the TOEFL, an admitted student may be required to re
to the Admissions Office to make arrangements for taking an English Placer
Test for foreign students prior to registration. Results of this test will deter
the courses the student will be permitted to register for in his program of st

TRANSFER WITHIN THE UNIVERSITY

For information concerning transfer from one college, school, or division
another within the University, see page 48.

Registrati

THE DATES, HOURS, AND PLACE OF REGISTRATION will be stated in the *Sched*
of Classes, which is available well in advance of each semester.

A student cannot register for classes until he has received a letter of adm
sion to the University issued by the appropriate admitting office.

No registration is accepted for less than a semester or one summer session

A student may not register concurrently in this University and another in
tution without the prior permission of the dean of the college, school, or di
sion in which he is registered in this University. Registration in more than o
college, school, or division of the University requires the written permission
the deans concerned, *prior to registration*. Allowance of credit for work do
concurrently at another institution is at the discretion of the appropriate co
mittee.

ELIGIBILITY FOR REGISTRATION

Registration for the following categories of campus students is held on the da
of registration stated in the University Calendar. A student who is suspend
or whose record is not clear for any reason is not eligible to register. Regist
tion in a given course may be denied students in the Division of Univers
Students when space is needed for degree candidates.

New Student.—Upon receipt of a letter of admission, the new student
eligible for registration on the stated days of registration.

Readmitted Student.—A student previously registered in the University w
was not registered for campus courses during the preceding semester or su
mer session must apply for and receive a letter of readmission from the appr
priate admitting office before he is eligible for registration. A student register
for the spring semester of 1975 need not apply for readmission for the f
semester of 1975. Such a student is a "Continuing Student."

Continuing Student.—The student registered for campus courses in the immediately preceding semester of the academic year is eligible to register upon presentation of his Registration Card from the previous semester. The student registered for the 1975 Summer Sessions campus courses, and not restricted to summer registration, is eligible to register for the 1975 fall semester on presentation of his 1975 Summer Sessions Registration Card.

REGISTRATION CHANGES AND WITHDRAWALS (See pages 33–34, 48)

REGISTRATION FOR CONSORTIUM COURSES

On-campus degree students interested in taking courses at any of the other institutions in the Consortium of Universities of the Washington Metropolitan Area, Inc. (see pages 52–53), should consult the program announcements of the other institutions. Consortium application forms and instructions are available from the Registrar after the student has obtained his registration packet. In order to participate in the Consortium program (1) the graduate student must obtain the approval of his adviser and should ascertain from the department of the institution where the course is taught whether or not he is eligible for the course and whether there is a space in the class *or* (2) the undergraduate student must obtain the approval of his adviser and *must* ascertain from the department of the institution where the course is taught whether or not he is eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar.

Fees and Financial Regulations

FEES PAID BY STUDENTS cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution make up the difference.

The following fees and financial regulations were adopted for the 1975 summer sessions and the academic year 1975-76. (See pages 31–32 for projected tuition increases for 1976-79.)

Tuition Fees

For undergraduate study in Columbian College of Arts and Sciences, the School of Education, the School of Government and Business Administration, the School of Public and International Affairs; and for courses taken on campus by undergraduate students in the College of General Studies:

Full-time program (12 or more), each semester	$1,250.00
Part-time program, for each semester hour	94.00

For graduate study* in the Graduate School of Arts and Sciences, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs; and for courses

*Payment of tuition for a Master's thesis entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, additional time may be granted in accordance with the regulations of the school in which the student is registered.

taken on campus by graduate students in the College of General Studies (Exception: doctoral students registered prior to July 1, 1967, who wish to continue payments according to the plan (see below) in effect prior to that date):

For each semester hour for which a student registers	$
For students registered in the Division of University Students:	
For each semester hour for which the student registers	
For students registered for doctoral degrees* in the Graduate Council (now the Graduate School of Arts and Sciences) and the School of Government and Business Administration prior to July 1, 1967, who wish to continue payments according to the plan in effect prior to that date:	
For work leading to and including the general examination	2,50
For work leading to and including the final examination	2,50
For students registered for the Doctor of Education degree† prior to July 1, 1967, who wish to continue payments according to the plan in effect prior to that date:	
For work leading to and including the major field examination	$3,13
For work leading to and including the final examination	$1,86
University Center Fee (charged all students registered on campus,‡ nonrefundab	
For students registered for 11 or more semester hours on campus: Each semester	46
For students registered for less than 11 semester hours in a semester on campus:	
For each semester hour for which the student registers	4
For students maintaining "continuous registration" status: Each semester	4

Additional Course Fees

In certain courses additional fees, such as laboratory and material fees, are charg as indicated in the course descriptions. These fees are charged by the semester an unless otherwise indicated, may be defrayed in two payments when the tuition is pa in this manner. Breakage of apparatus is charged against the individual studen When breakage is in excess of the normal amount provided for in the laboratory fe the individual student will be required to pay such additional charges as are dete mined by the department concerned.

Graduation Fees

Associate in Arts	
Bachelor's, Master's, Education Specialist, Doctor's degrees	$10.0
Post-Master's Graduate Certificate in Health Care Administration	25.0
	25.0

* The tuition fee is to be paid at the rate of $625.00 a semester or in full at the beginning of eac stage of the doctoral discipline. No "continuous registration" fee will be charged if a third ye is needed for completion of either part of the degree requirements. If still more time is needed the student must maintain continuous registration and pay the continuous registration fee.

† As long as there is an unpaid balance for the part of the program on which the student working, he must make at least the minimum tuition payment of $312.50 at each fall and sprin registration (and for any summer session in which he registers for academic work).

If the total fee is paid for the part of the program on which the student is working, he may continue to register, without additional fee, for courses approved by his Master in Research, until the expiration of the time allowed for that part of his program.

‡ Students in the College of General Studies are charged the University Center Fee only when registered for courses on campus.

e for Binding Master's Thesis	10.00
e for Microfilm Service and Printing Announcement of Final Examination (Doctoral candidates)	60.00
sidence Hall Fees (see page 57)	

ecial Fees and Deposits

pplication fee (undergraduate degree candidate), nonrefundable	10.00
pplication fee (graduate degree candidate), nonrefundable	25.00
dvanced tuition deposit, nonrefundable, charged each entering or readmitted full-time undergraduate student	100.00
ousing deposit, nonrefundable, charged each applicant for residence hall space	100.00
dmission tests (when required)	6.00–12.00
ational Teacher Examinations fee, for Bachelor of Arts in Education degree candidates	9.00–13.00
ate-registration fee, for failure to register within the designated period	15.00
ate-payment fee, for failure to make payments when due (see "Payment of Fees," page ?)	15.00
inancial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," page ?)	35.00
eturned check fee, charged a student whose check is improperly drafted, incomplete, returned by the bank for insufficient funds, or for any other reason	15.00
ontinuous Registration fee, to maintain "continuous registration" status during any semester of absence from the University or after completion of tuition requirements*—due and payable on the official days of registration	$94.00
For special physical examination	2.00
Special Columbian College of Arts and Sciences departmental examination for each course to qualify for receiving credit (advanced standing), waiver of requirement, or both	25.00
For each examination to qualify for advanced standing and for each special examination	5.00
English test for foreign students (when required)	5.00
Laboratory checkout fee, for failure to check out of Chemistry laboratory by the date deadline set by the instructor†	3.00
Transcript fee, for each transcript of record	2.00
Replacement of lost or stolen picture identification card	2.00

Registration for on-campus courses in the University entitles each student to the following University privileges: (1) the services of the Student Career Services Office; (2) the use of the University Library; (3) gymnasium privileges; (4) admission to all athletic contests, unless otherwise specified; (5) subscription to the *University Hatchet*, the student newspaper; (6) admission to University debates; (7) medical attention as described under Student Health Service. These privileges terminate when the student withdraws or is dismissed from the University.

PROJECTED TUITION AND FEE INCREASES 1976-79

In order that students and their parents may plan more realistically for a total four-year period, tuition increases for the academic years 1976-77, 1977-78, and 1978-79 have been estimated as follows:

Increase by year (full-time undergraduate students):

1976–77	
1977–78	$1
1978–79	2
	2

‡Increase by semester hour (graduate and part-time undergraduate students):

1976–77	
1977–78	
1978–79	

The University Center fee will be increased for the 1976 summer sessi and the academic year 1976-77. For students taking 11 or more seme hours, the fee will be not more than $52.50 a semester, a maximum incre of $6. Students taking less than 11 semester hours will pay not more than a semester hour, a maximum increase of $.65.

Every effort will be made to keep tuition increases within the above lim However, it is not possible to project future economic data with certainty, circumstances may require an adjustment in these estimates.

PAYMENT OF FE

No student is permitted to complete registration or attend classes until charges are paid. Tuition and fees for each semester are due and payable full at the Office of the Cashier at the time of each registration. Checks a postal money orders should be made payable to George Washington Universit with the student identification number in the upper left-hand corner.

The Student Accounts Office has responsibility for billing and maintainin student accounts for tuition, various fees, and room and board charges. A st dent registered for 6 semester hours or more may sign a deferred payme contract with the Student Accounts Office at the time of each registration pe mitting him to pay one-half of the total tuition and fees (except for fees pay able in advance) at the time of registration and the remaining half on or b fore October 22, 1975 (for the fall semester), and March 10, 1976 (for th spring semester). Interest at the rate of 8 per cent per annum on the unpa balance will be charged from the date of registration to the date payment made.

Students receiving tuition assistance in the form of scholarships, govern ment tuition contracts, or other forms of tuition awards are not permitted t sign deferred payment contracts unless the total tuition and fee charges exce the value of the tuition awards by $590 or more. Under such circumstance the student may be permitted to pay one-half of the amount due from th

---

* Payment of the continuous registration fee entitles the student who is granted leave of absen to return and continue his work toward a degree under the academic requirements which were i force at the time of his first registration. The continuous registration fee applies toward neithe tuition fee nor residence requirements for the degree.
This fee does not apply to students granted military leave, see page 49.
† A student who drops a Chemistry course before the end of the semester must check out of th laboratory at the next laboratory period.
‡ Semester-hour increases become effective at the beginning of the summer sessions preceding th academic year.

ent at the time of registration and to defer the balance by signing a de-
d payment contract.
udents who fail to make any payment when due will be automatically
ged a $15 late-payment fee and will be subject to the interest charge of 8
cent per annum. Accounts which become 30 days past due will be finan-
y encumbered. In the event a student's account is financially encumbered,
student forfeits his rights to the use of deferred payment contracts in future
esters, and the Student Accounts Office will notify the Registrar to with-
grades, future registration privileges, transcripts, diplomas, and other aca-
ic information until the account is settled financially. Financial settlement
require payment in full of all amounts due the University in addition to a
ncial reinstatement fee of $35.
tudents auditing courses are subject to all fees charged to students registered
credit.

PREPAID AND DEFERRED PAYMENT PLANS FOR PARENTS

eral commercial programs for parents who wish to pay for college on a
nthly basis are available. Terms and conditions vary, but most provide a life
rance policy in the contract. For specific details and applications, address
uiries to the following:

. Girard Edu-Check Plan, 2nd and Chestnut Streets, Philadelphia, Pa. 19106
. Richard C. Knight Insured Tuition Payment Plan, 6 St. James Avenue, Boston, Mass. 02100
. The Tuition Plan, Inc., Concord, N.H. 03301

he University's Office of Student Financial Aid does not maintain a supply applications for these various programs, but will be happy to provide guid-
e to students and parents.

THDRAWALS AND REFUNDS*

plications for withdrawal from the University or for change in class sched-
must be made in person or in writing to the dean of the college, school, division in which the student is registered. Notification to an instructor is an acceptable notice (see "Withdrawal," pages 47–48).
n authorized withdrawals and changes in schedule, cancellations of semester ion charges and fees will be made in accordance with the following schedule the fall and spring semesters:

Complete withdrawal from the University:

ALL SEMESTER

Withdrawal dated on or before September 5, 1975	90 per cent
Withdrawal dated September 8 to September 19, 1975	75 per cent
Withdrawal dated September 22 to October 3, 1975	50 per cent
Withdrawal dated after October 3, 1975	none

gulations concerning withdrawal and refunds for the summer sessions are stated in the *Summer ns Catalogue*.

SPRING SEMESTER

Withdrawal dated on or before January 23, 1976 90
Withdrawal dated January 26 to February 6, 1976 75
Withdrawal dated February 9 to February 20, 1976 50
Withdrawal dated after February 20, 1976

2. For a *change in status from full-time to part-time student* or for *withdrawal by a part-time student*, the above schedule applies to the ence in charges between the original program and the adjusted p continuing in effect.
3. A student enrolled in an undergraduate full-time program who or adds a course and continues to be in a full-time program will h financial adjustments of tuition made other than those involving cours
4. A student who is granted military leave before completing the semest receive credits for current charges in accordance with the schedule fo plete withdrawal from the University (see No. 1 above). Payments in excess of the nonrefundable balance will be refunded to the st The nonrefundable balance will be maintained as a deferred credit f by the student when he returns to the University (see "Military L page 49).
5. Regulations governing student withdrawals as they relate to residen and food service charges are contained in the specific lease arrangeme

---

In no case will tuition be reduced or refunded because of absence from cl

Payment applies only to the semester for which a registration charge curred and will not be credited to another semester (exception: students gr military leave, see page 49).

Authorization to withdraw and certification for work done will not be a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can banking arrangements in the community.

Financial

FOR UNDERGRADUATE STUDEN

GEORGE WASHINGTON UNIVERSITY offers a program of financial assistanc two basic types: awards for academic achievement without reference to fi cial circumstances—honor scholarships; and scholarships, grants, loans, employment based upon demonstrated financial need.

Honor Scholarships.—George Washington University honor scholarship up to $1,000 for the academic year based entirely upon academic achieve and potential without regard to financial need, are restricted to incoming f men and are extremely limited in number.

---

* For information concerning financial aid for students from foreign countries, see page 40.

ed-based Aid.—The University offers extensive programs of scholarships, s, loans, and employment based upon demonstrated need. The University cipates in the National Direct Student Loan, Basic Educational Opportu- Grant, Supplemental Educational Opportunity Grant, and the College k-Study programs.

pplications and supporting credentials for financial aid must be filed by uary 1 (entering freshmen), March 1 (enrolled undergraduate or entering fer students) preceding the academic year of the award for the fall se- er; by November 1, for the spring semester; and May 1, for the summer on*. A student must reapply for financial aid each year.

omplete information concerning financial assistance is contained in the phlet "Student Financial Aid," which is available at the Office of Student ncial Aid, George Washington University, Washington, D.C. 20052.

he following scholarships are available to students in Columbian College of and Sciences, the School of Education, the School of Government and ness Administration, and the School of Public and International Affairs. University also offers other scholarships which are available to students in e colleges and schools as well as other schools.

he George Washington University Board of Trustees Scholarships.—Full- partial-tuition scholarships, which begin in the fall semester and extend four successive academic years, provided the holder maintains a *B* average, well as a high standard of deportment, and continues to be in financial need. ndidates must plan to select a curriculum leading to a Bachelor's degree ny school of the University, except the College of General Studies. Stu- ts who have demonstrated outstanding ability in interscholastic speech and ate activities are eligible for the George F. Henigan Scholarships in Debate ch are included among these scholarships.

HER SCHOLARSHIPS

hievement Rewards for College Scientists (ARCS) Foundation, Inc., Scholarship
rman Page Allen Memorial Scholarship Fund (1966)
mni Scholarships
ry J. Anderson Scholarship (1969)
che and Company Scholarships
ron Andrews Scholarship (1920)
nry N. Brawner, Jr., Foundation Scholarship Fund (1963)
ma K. Carr Scholarships (1932)
ria M. Carter Scholarship (1871)
l E. Casassa Memorial Foundation Scholarship (1968)
i Omega Alumnae Scholarship (1966)
lumbian Women Scholarship Funds
Victoria Briggs Scholarship Fund (1959)
Elizabeth V. Brown Scholarship Fund (1925)
Grace Ross Chamberlin Scholarship Fund (1932)
College Women's Scholarship Fund (1926)
Columbian Women Members' Scholarship Fund (1961)

Summer Sessions student is eligible for consideration only if he is enrolled in this University for east 8 semester hours in the immediately preceding spring semester or has applied for financial for the following fall semester.

Arline Hughes Dufour Scholarship Fund (1961)
Dr. Watson W. Eldridge, Jr., and John F. Eldridge Scholarship Fund
Founders of Columbian Women Scholarship Fund (1920)
Rose Lees Hardy Foundation Scholarship Fund (1957)
Lillian Young Herron Scholarship Fund (1925)
Nellie Maynard Knapp Scholarship Fund (1915)
Marcia B. Kraft Scholarship Fund (1966)
Janet McWilliams Scholarship Fund (1954)
Marie-Louise Ralph Turner Scholarship Fund (1963)
D.C. Daughters of the American Revolution Scholarship (1952)
Isaac Davis Scholarship (1869)
District of Columbia Institute of Certified Public Accountants Schola
Accounting (1964)
Estella Constance Drane Scholarship (1957)
Louise Smith Engel Scholarship (1972)
Robert Farnham Scholarship (1871)
Federal Government Accountants Association—Washington, D.C., Ch
Scholarship in Accounting
Esther Brigham Fisher Scholarship (1951)
Foreign Student Scholarships (see page 40)
General Motors College Scholarship (1955)
Mildred Green Memorial Scholarship Fund (1959)
Anna Spicker Hampel Scholarship (1949)
Julian O. Hargrove Scholarship (1968)
Elma Lewis Harvey Scholarship (1921)
Hazleton Scholarship (1950)
George F. Henigan Scholarships in Debate (1967)
David B. and James L. Karrick, Jr., Scholarship Fund (1968)
Samuel and Elizabeth Kay Scholarships 1969)
Amos Kendall Scholarship (1869)
L. Poe Leggette Memorial Scholarship Established by WRGW (1968)
Martha's Marathon Residence Hall Scholarship
Mitchell-Stancioff Scholarship (1967)
A. Morehouse Scholarship (1861)
E. K. Morris Education Fund Scholarships (1972)
Helen Marie and Thomas E. Orr Scholarships (1965)
Phi Delta Gamma Scholarships (1956)
Fred B. and Alma D. Pletcher Scholarship Fund (1968)
Levin M. Powell Scholarships (1886)
Research Assistantships in Operations Research and Related Fields (see
37)
Resident Assistantships (see pages 37–38)
Henry Whitefield Samson Scholarship Fund (1966)
Lula M. Shepard Scholarships (1946)
Sigma Delta Chi Foundation of Washington, D.C., Scholarships
Margaret Lucille Snoddy Scholarship (1970)
David Spencer Scholarship (1918)
Mary Lowell Stone Scholarship (1893)
Charles Clinton Swisher Scholarships (1941)
Tau Kappa Epsilon Scholarship (1959)
U.S. Office of Education Traineeships (1964)

ersity Players Scholarship in Memory of L. Poe Leggette (1968)
(1am Walker Scholarship (1824)
ail Ann Brown and Henry Kirk White Scholarship Fund (1963)
Withington Scholarship (1830)
nen's Physical Education Alumnae Association Scholarship (1964)
lam G. Woodford Scholarship (1969)
Woodhull Scholarship (1919)
la Club Scholarship (1950)

NTS

following funds have been established to meet the special needs of disad-aged students from the District of Columbia Inner-City and the Washington opolitan area.

rge Washington University's Educational Opportunity Program Tuition rants (1968)
Club of Walt Whitman High School, Bethesda, Md., Grant (1968)
rriott Foundation Grant (1968)

FOR GRADUATE STUDENTS*

George Washington University program of financial assistance for graduate lents includes assistantships, fellowships, traineeships, graduate scholarships, arch appointments, part-time employment, and loans. Application for ad-sion to graduate study is a prerequisite for consideration.

Application and correspondence concerning assistantships, fellowships, train-hips, or graduate scholarships should be sent directly to the dean of the ool concerned, and addressed to George Washington University, Washing-, D.C. 20052. Unless otherwise specified, application and supporting creden-s should be submitted no later than February 1 preceding the academic year which the award is made.

SISTANTSHIPS

Research Assistantships in Operations Research and Related Fields.—Avail-e to graduate students, juniors, and seniors, in any college or school of the iversity. Research Assistants are expected to work 20 hours a week con-cting research in support of an established research program, in program-ng or in conducting individual research on an approved research project. ends range up to $7,500, depending on the status of the student and the ure of the appointment (9-12 months). Applications must be received prior March 1. Further information and applications are available from the rector, Institute for Management Science and Engineering, School of Engi-ring and Applied Science, George Washington University, Washington, D.C. 052.

Resident Assistantships (men and women).—Available to graduate students l seniors in any field of study who are interested in working with the student sonnel program in University residence halls. Specific duties vary with the

* For information concerning financial aid for students from foreign countries, see page 40.

position, but basically consist of counseling, advising student groups, a ministration. Remuneration includes full tuition and a furnished room f academic year. All positions are part-time, and staff members are requi enroll as full-time students in degree granting programs. Application sho completed before March 1. Further information may be obtained fro Office of the Director of Housing.

Arlington County—George Washington University Cooperative Assista Program

Health Care Administration Research Assistantships

National League of Cities/George Washington University Assistantship

Urban Affairs Assistantship

FELLOWSHIPS, INTERNSHIPS, TRAINEESHIPS, SPECIAL PROGRAMS

The following fellowships, internships, and traineeships are available to stu in the Graduate School of Arts and Sciences, the School of Educatio School of Government and Business Administration, and the School of and International Affairs. The University also offers many other fello which are available to students in these colleges and schools.

Graduate Teaching Fellowships.—Available to graduate students in M and doctoral programs in most departments of the University. Each te fellow renders a designated unit of service to his major department of in tion and receives a stipend of up to $3,000 (on a nine-month basis), plu tion, course fees, and University Center fee.

Research Traineeships.—Available under numerous sponsored program number of departments. Currently, the basic medical science departmen the departments of Psychology and Speech and Drama offer such prog Stipends vary; information is available from the departments and the Offi the Dean of the Graduate School of Arts and Sciences.

Achievement Rewards for College Scientists (ARCS) Foundation, Inc., F ship

Robert A. Aleshire Fellowship Fund (1971)

American Association of Collegiate Schools of Business Fellowship

American Civilization Fellowships

American Civilization Internships (Smithsonian Institution-George Washi University Cooperative Program)

American Iron and Steel Institute Fellowship

Arthur Anderson & Co. Doctoral Fellowship

Winfield Scott Blaney Fellowship in International Affairs (1961)

Oliver T. Carr, Sr., Memorial Fellowship in Urban and Regional Planning

Thomas Alva Edison Fellowship

Elementary Teacher Education Internships

Ernst & Ernst Grant to Doctoral Candidates in Business or Economics

Foreign Student Fellowships (see page 40)

Health Care Administration Fellowships

Richard D. Irwin Doctoral Fellowships

Isabella Osborn King Research Fellowships (1927)

Loula D. Lasker Fellowships in Housing, City Planning, or Urban Renewal

Mellon Foundation Fellowships

Minorities in Planning and Related Professions Program

onal Association of Purchasing Management Fellowship
onal Historical Publications Commission-George Washington University
ooperative Research Fellowships
onal Science Foundation Graduate Fellowships
ources for the Future, Inc., Fellowship Prize
Bibliography Internships
mas Bradford Sanders Fellowships (1928)
tish Rite Fellowships
Office of Education Fellowships (1964)
Public Health Service Traineeships
Public Health Service Traineeships in Comprehensive Health Planning
an Studies Fellowships of the Department of Housing and Urban Development
an Transportation Center Fellowship

ADUATE SCHOLARSHIPS

ed Forces Health Professions Scholarship Program (The Uniformed Services Health Professions Revitalization Act of 1972 (Public Law 92-426)
na K. Carr Scholarships (1932)
H. and Margaret M. DeMaine Scholarships (1967)
rict of Columbia Institute of Certified Public Accountants Scholarship in ccounting (1964)
er G. McGaw Scholarship in Health Care Administration (1971)
chell-Stancioff Scholarship (1967)
Pearson Scholarship Fund (1940)
Delta Gamma Scholarship Fund (1968)
rhees Scholarships
cott Foundation Scholarships

ONSORED AWARDS FOR GRADUATE STUDY

rmation regarding awards sponsored by foundations, professional and ned societies, industries, and others which may be used in support of duate study is available at the Graduate Fellowship Information Center, 5 H Street N.W., for students enrolled at George Washington University. rmation is also available on the prestige programs such as the Rhodes, rshall, Woodrow Wilson, Fulbright, Rotary International, and Danforth, as as many others.

s deadlines for application vary, qualified students should make inquiries in advance of the year of planned graduate study.

LOAN FUNDS

following loan funds are available to undergraduate and/or graduate students in Columbian College of Arts and Sciences, the Graduate School of Arts Sciences, the School of Education, the School of Government and Business ministration, and the School of Public and International Affairs. A separate lication must be submitted for all loan programs. Applications for the

National Direct Student Loan should be filed no later than April 1 spring semester. Complete information is contained in the pamphlet " Financial Aid," which is available in the Office of Student Financi George Washington University, Washington, D.C. 20052.

American Medical Association Nursing Home Administration Loan Fund
Foreign Student Loan Fund (1967)
W. K. Kellogg Foundation Hospital Administration Loan Fund
Jessie B. Martin Loan Fund (1967)
National Direct Student Loan Program
Ellis H. Stearman Emergency Loan Fund
Hiram Miller Stout Memorial Loan Fund (1973)
U. S. Loan Program for Cuban Students
University Student Emergency Loan Fund

STUDENT EMPLOYMENT

The University participates in the College Work-Study Program. In should be addressed to the Office of Student Financial Aid. In additio Student and Alumni Career Services Office maintains a registry of both fu and part-time positions available in the Washington area for undergra and graduate students.

After registration, students may apply at the Student and Alumni Services Office, Woodhull House, 2033 G Street, N.W., for interviews a ferrals to positions for which they are qualified.

FOREIGN STUDENTS

Undergraduate foreign students with proven financial need who have comp one semester of full-time work (15 hours) at this University with a *B* av are eligible to apply for the Board of Trustees Scholarships. Scholarship awarded in the spring for the following academic year. See instruction applying for undergraduate financial aid, pages 34–35.

Limited awards for graduate teaching fellowships are the responsibility chairman of the department or dean of the school in which the degree is earned. Work as a teaching fellow requires excellent knowledge of Engl both spoken and written.

Long-term loan funds for undergraduate and graduate foreign student limited in amount and are available only to those foreign-born persons who established resident status in the United States through the Immigration Naturalization Service.

We suggest that students who wish to study in the United States have able sufficient funds to cover expenses for one full year before attempti enter a college or university. The cost at this University for one academic (September-May) is approximately $5,000. This estimate includes room board, tuition, books, clothes, and incidental expenses; no travel, holida medical expenses are included.

LAW ENFORCEMENT EDUCATION PROGRAM

is program of grants and loans, authorized under the provisions of the Omni- Crime Control and Safe Streets Act of 1968, is intended to help pay the t of educational expenses of officers who are employed by publicly funded enforcement or correctional agencies. Studies may be full- or part-time in ide range of subject areas and degree goals. Priority will be given to officers the state and local levels, and to veterans of the Armed Forces of the United tes. Applications and further information are available from the LEEP Co- inator, Department of Forensic Sciences.

Prizes

Accounting Prizes.—Three prizes awarded annually by the Department of counting—one each to the undergraduate Accounting major with the highest holastic standing, to the candidate for the degree of Master of Business Ad- nistration with the highest scholastic standing in the Accounting concentra- n, and to the Doctoral candidate with a field in Accounting who has the ghest scholastic standing at the completion of the General Examination.

Alpha Chi Sigma Prize.—Awarded annually by the Alpha Pi Chapter to the dent who has attained the highest academic record in courses in chemistry. e name and year of graduation of the student is inscribed on a bronze que. The winner must have had at least 16 hours in chemistry, including the al semester at this University.

Alpha Kappa Psi Prize.—A key, awarded annually by Beta Mu Chapter to male student who has completed 90 semester hours at this University and ained the highest average grade in business administration, economics, inter- tional business, public accounting, and public finance. The name of the win- r and the year of the award are engraved on a plaque in the Office of the an of the School of Government and Business Administration.

American Institute of Chemists Prize.—A medal awarded annually to the aduating student majoring in chemistry who excels in scholarship, integrity, d leadership.

Department of Art Prizes.—Two prizes—one for an undergraduate majoring Art History and one for an undergraduate majoring in Fine Arts—awarded nually to the most promising students, as determined by the departmental culty.

The Walter G. Bryte, Jr., Achievement Award.—Provided by Walter G. yte, Jr., Colonel, U.S. Air Force (retired), first Professor of Air Science at orge Washington University. The award is presented annually primarily to t undergraduate residence hall, secondarily to any other activity at the Uni- sity, which has shown under the leadership of its elected or designated head, most improvement or excellence in its support of the principles and aims the United States of America and George Washington University. The hall

or other activity will be awarded a cash prize, and the name of its leader the hall or activity will be engraved on a silver trophy.

Byrne Thurtell Burns Memorial Prize.—Awarded to the senior majorin chemistry who shows the greatest proficiency in organic chemistry, as evidet by a comprehensive examination, and who possesses such qualifications of m character, and personality as to give promise of future achievement.

Business Administration Prize.—Awarded annually by the Department Business Administration to the outstanding graduating senior in the accoun or business administraton degree program on the basis of scholarship, lea ship, and service to the University.

Wilbur J. Carr Prize.—Established in 1962 by Edith K. Carr, former T tee of the University, in memory of her distinguished husband, who was gra ated from the School of Comparative Jurisprudence and Diplomacy in 18 It is awarded annually to that man in the graduating class of the Univer who has demonstrated outstanding ability in his study of international aff and who has given evidence of possessing in marked degree the qualities wh produce the good citizen and the dedicated public servant.

The Chemical Rubber Co. Freshman Chemistry Achievement Prize: *Handbook of Chemistry and Physics* awarded annually to the freshman stu who has demonstrated the greatest achievement in Chemistry 15-16.

The Columbian Women Prize.—Awarded to the senior woman who in undergraduate life has most nearly fulfilled the objectives of Columbian Wo

John Henry Cowles Prizes.—Two prizes, established by John H. Cow Grand Commander of the Supreme Council of Thirty-third Degree (Mo Council of the World) of the Ancient and Accepted Scottish Rite of F masonry, Southern Jurisdiction of the United States of America. Awar annually to the senior in the School of Government and Business Admini tion and to the senior in the School of Public and International Affairs with highest academic averages.

DeWitt Clinton Croissant Prize.—Awarded annually to the undergrad student enrolled in a course in drama or active in University dramatics submits to the English Department the best essay on drama or the theatre.

E.K. Cutter Prize.—Established by Marion Kendall Cutter "for excelle in the study of English." Awarded to the member of the graduating class wh record in English, combined with general excellence, shows most marked tude for and attainment in English studies.

Isaac Davis Prizes.—Established in 1847 and awarded annually to the t seniors who have made the greatest progress in public speaking while enro in the University. Awards are to be determined by a public-speaking co in which the participants deliver original orations. Only members of the se class of Columbian College of Arts and Sciences who are candidates for degree of Bachelor of Arts or Bachelor of Science are eligible to compet

Henry Grattan Doyle Memorial Prize.—Established in memory of He Grattan Doyle, a former Dean of Columbian College. Awarded annually an outstanding senior for excellence in Spanish.

Elton Prize.—Established by the Reverend Romeo Elton, of Exeter, E land, and awarded annually to the student with the highest average in the advanced course in the Greek language and literature.

Jesse Frederick Essary Prize in Journalism.—Established by Helen Ess Murphy and awarded annually to a student who has given promise of so citizenship and who submits the best printed and published evidence of ab

"forthright reporting" and good journalistic writing, in a student publication elsewhere.

Joshua Evans III Prize in Political and Social Sciences.— A memorial prize established by friends because of an outstanding life." Awarded annually to hat man in the graduating class "who has demonstrated his signal ability in he social and political sciences and who has given promise of the interpretaon of that ability in good citizenship among his fellows."

Willie E. Fitch Prize.—Established by James E. Fitch in memory of his son. Awarded annually to a senior student for the best examination in chemistry.

Alice Douglas Goddard Prize.—A memorial established by Frederick Joseph Goddard, of Georgetown, D.C. Awarded annually to the senior student making he highest average in American literature.

Edward Carrington Goddard Prize.—Established by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Georgetown, D.C., in memory of Edward Carrington Goddard, class of 1881. Awarded to he junior or senior student making the highest average in the French language nd literature.

Morgan Richardson Goddard Prize.—A memorial established by Mary Wiliamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Georgetown, D.C. Awarded to the junior or senior student making the highest verage in the following fields: business administration, economics, internaonal business, or public accounting.

Government Employees Insurance Company and Affiliates Achievement wards.—A $200 cash award is given in each of the following five areas: Health Care Administration, Management Science, Public Administration, usiness Statistics, and Urban and Regional Planning.

Gardiner G. Hubbard Memorial Prize in United States History.— Established y Gertrude M. Hubbard in memory of her husband and awarded annually to hat member of the graduating class majoring in history who has maintained he highest standing in courses in United States history.

International Business Prize.—Two prizes awarded annually by the School Government and Business Administration to students specializing in interational business, one awarded to a graduating senior and one awarded to a raduate student.

Kappa Kappa Gamma Prize.—Awarded annually to a full-time freshman or phomore student for excellence in Biological Sciences 12.

David Lloyd Kreeger Prizes in Art.—Five prizes given by Mr. Kreeger, three the fine arts and two in art history (including museology). Fine arts prizes e awarded to a senior or graduate student in painting, sculpture, and graphics design. One prize in art history is awarded to a senior and one to a graduate ident. Candidates for the prizes must submit original papers or works of art. Winners are selected by distinguished representatives of the field of art in the Washington, D.C., area.

Minna Mirin Kullback Memorial Prize.— Established in 1968 by Solomon ullback in memory of his wife. Awarded annually by a committee of faculty embers of the Department of Statistics to a full-time undergraduate or graduate student majoring in statistics, who will have completed 18 semester hours of atistics courses by the end of the spring semester.

John Francis Latimer Prize in Classics.—Established in 1973. Awarded to a aduating senior who has made the most outstanding record as a major in e Department of Classics.

Hilda Haves Manchester Prize in Sociology.—Established in honor of H Haves Manchester, B.A. 1932, an outstanding student whose major field sociology. Awarded annually by Columbian College of Arts and Science the senior woman student majoring in sociology who has the highest schol record.

Vivian Nellis Memorial Prize.—Awarded to a student in the English Dep ment who has shown special promise in the field of creative writing.

Phi Delta Kappa Prize.—Awarded annually by Beta Gamma Chapter to outstanding senior man in the teacher education program in the School of E cation.

Phi Eta Sigma Prize.—A choice book selected from the field of the re ent's major, awarded annually by the George Washington University Cha to the male student attaining the highest scholastic average in his first semester of work. The winner's name is engraved on a plaque in the Offic the Dean of Columbian College of Arts and Sciences.

Pi Lambda Theta Prize.—Awarded annually by Alpha Theta Chapter to outstanding senior woman in the teacher education program in the Schoo Education.

Psi Chi Prizes.—Two prizes awarded annually by the George Washing University Chapter to the best undergraduate student in experimental p chology and to the M.A. degree candidate or second-year graduate student s mitting the best thesis or research project in psychology.

Ruggles Prize.—Established by Professor William Ruggles in 1859, awar annually to a candidate for a Bachelor's degree for excellence in mathemat

Hermann and Johanna Richter Schoenfeld Prize.—Established in grate appreciation of the inspired teaching and devotion to his students of Dr. H mann Schoenfeld, who for more than 20 years until his death in 1926 hea the Department of German. Hermann Schoenfeld, Ph.D., LL.D., was wid recognized as a scholar of distinction whose presence on the faculty ad prestige to the University. This prize is given annually to a member of graduating class for excellence in historical and cultural phases of Ger studies.

Society of Colonial Wars in the District of Columbia Prize.—A gold me awarded to a candidate for a graduate degree who, in the judgment of the f ulty of the Department of History, submits a thesis or dissertation demonstr ing excellence in historical research in American Colonial history. The Univ sity reserves the right to withhold the award if no thesis or dissertation att ing the required degree of excellence is submitted.

Staughton Prize.—Established by the Reverend Romeo Elton and awar annually to the student making the best record in the most advanced course the Latin language and literature.

James MacBride Sterrett, Jr., Prize.—Established in 1911 by Professor S rett in memory of his son. Awarded annually to the student who obtains highest average in Physics 1 and 2.

Charles Clinton Swisher Historical Club Prize.—Established in 1936 by Charles Clinton Swisher Historical Club and augmented in 1941 by the bequ of Professor Swisher. Awarded annually to the student who submits the b essay covering some phase of medieval history.

James H. Taylor Graduate Mathematics Prize.—Established in memory James H. Taylor, former Professor of Mathematics at the University. Award annually to a graduate student for outstanding performance in mathemati

Benjamin D. Van Evera Memorial Prize.—Awarded annually to that Graduate Teaching Fellow in Chemistry selected as the most effective teacher during the current academic year.

The Wall Street Journal Leadership Prize.—Awarded annually to a graduating senior in the Bachelor of Business Administration degree program for outstanding leadership and service to the University.

Thomas F. Walsh Prize.—Established in 1901 and awarded annually to the student who submits the best essay in Irish history.

The Washington Society of Investment Analysts Scholarship Fund.—A $500 award given annually to a candidate for the degree of Master of Business Administration in the field of Finance and Investments who is a U.S. citizen and whose career objectives are in the field of investment analysis, securities portfolio management, or related pursuits.

Alexander Wilbourne Weddell Prize.—Established in 1923 by Virginia Chase Weddell in memory of her husband. Awarded annually to a candidate for a degree who writes the best essay on the subject of "the promotion of peace among the nations of the world." The prize essays shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.

Regulations

STUDENT ENROLLED in the University is required to conform to the following regulations and to comply with the rules and regulations of the college, school, or division in which he is registered.

A student who withdraws or is suspended, or is otherwise absent from the university for one semester or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be cancelled. If such falsification is discovered after the student has established an academic record at the University, he may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the Faculty) for subsequent registration in the University.

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. He may attend only those classes for which he is registered. Regular attendance is expected. A student may be dropped from any course for undue absence.

SCHOLARSHIP REQUIREMENTS

A student who fails to maintain the scholarship requirements of the coll school, or division in which he is registered may be dismissed from the versity.

GRADES

Grades are mailed to the student through the Office of the Registrar at the c of each semester. They are not given out by instructors.

UNDERGRADUATE

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Satisfact *D*, Low Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; *CR*, Cre *NC*, No Credit. Except for courses which specifically state that repetition credit is permitted, a candidate for a degree at this University may not rep for credit a course in which he has received a grade of *D* or better, unless quired to do so by the department concerned. A written statement to effect must be submitted to the Registrar by the appropriate department ch man.

GRADUATE

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Minim Pass; *F*, Fail; *I*, Incomplete; *CR*, Credit; *W*, Authorized Withdrawal. Exc for courses which specifically state that repetition for credit is permitted candidate for a degree at this University may not repeat for credit a course which he has received a grade of *C* or above, unless required to do so by department concerned. A written statement to this effect must be submitted the Registrar by the appropriate departmental chairman. In the Gradu School of Arts and Sciences this regulation is slightly different (see page 9

INCOMPLETE/AUTHORIZED WITHDRAWAL

Whenever a grade has not been assigned, the symbol *I* (Incomplete) or symbol *W* (Authorized Withdrawal) will be recorded. The symbol *I* indica that a satisfactory explanation has been given the instructor for the stude failure to complete the required work of the course. At the option of the structor, the grade of *I* may be recorded if a student, for reasons beyond control, is unable to complete the work of the course, and if the instructor informed of, and approves, such reasons before the date when grades must reported. The grade may be used only if the student's prior performance class attendance in the course have been satisfactory. Any failure to compl the work of a course which is not satisfactorily explained to the instruct before the date when grades must be turned in will be graded *F*. If acceptab reasons are later presented to the instructor, he may initiate an appropri grade change.

MOVING AN INCOMPLETE

or information concerning the removal of a grade of Incomplete from a stu-
nt's record, consult the regulations of the college, school, or division con-
rned.

HE QUALITY-POINT INDEX*

cholarship is computed in terms of the quality-point index, obtained by divid-
g the number of quality points by the number of semester hours for which
e student has registered, both based on his record in this University. Quality
oints are computed from grades as follows: *A*, four points; *B*, three points;
, two points; *D*, one point; *F*, no points, for each semester hour for which
e student has registered. Courses marked *W*, *I*, *NC*, or *CR* are not con-
dered in determining the index, except that courses marked *I* will be con-
dered when a formal grade is recorded. Grades in courses taken at another
stitution are not considered in computing the quality-point index.

INAL EXAMINATIONS

inal examinations for undergraduate courses are scheduled at the end of each
emester by the Office of the Registrar. Examinations for courses numbered
01 or above are scheduled, if desired, by the individual department or instruc-
or.

CADEMIC DISHONESTY

he University community, in order to fulfill its purposes, must establish and
aintain guidelines of academic behavior. Although all members of the com-
unity are expected to exhibit honesty and competence in their academic work,
coming students have a special responsibility to acquaint themselves with, and
ake use of, all proper procedures for doing research, writing papers, and
king examinations.

Members of the community will be presumed to be familiar with the proper
cademic procedures and held responsible for applying them. Deliberate
ilure to act in accordance with such procedures will be considered academic
shonesty. Acts of academic dishonesty are a legal, moral, and intellectual
ffense against the community and will be prosecuted through the proper uni-
ersity channels.

Copies of the University policy on academic dishonesty can be obtained
om the following offices: all department chairmen, all academic deans, and
e Vice President for Academic Affairs.

ITHDRAWAL

ithdrawal from a course or from the University requires the permission of
e dean of the college, school, or division in which the student is registered.
ermission to withdraw from the University will not be granted a student who

*Applicable only to the Graduate School of Arts and Sciences, the School of Education, the School of Government and Business Administration, and the *graduate programs* in the School of Public and International Affairs.

does not have a clear financial record (see pages 33–34).

Each college, school, and division of the University sets deadline date each semester concerning withdrawal. Withdrawal between these dates an end of the semester is permitted only in exceptional circumstances.

All charges for courses dropped without the approval of the dean mu met by the student. Reporting the dropping of a course to an instructor not effect its discontinuance.

CHANGES IN PROGRAM OF STUDY

Changes within a College, School, or Division.—A student may not su tute one course for another, drop courses (see "Withdrawal," above), ch his status from credit to audit or audit to credit without the approval of dean of the college, school, or division in which he is registered.

Change from one section to another of the same course may be made the approval of the dean and the department concerned.

Change from one major subject to another within the same college or sch may be made with the approval of the dean. All requirements of the cours study to which the change is made must be met.

Transfer within the University.—Application for transfer to another colle school, or division must be made to the appropriate admitting office on the fo provided by the deans concerned. Transfer from the appropriate preprofessio curriculum in Columbian College to Bachelor's degree candidacy in the Sch of Education or the School of Public and International Affairs is automatic completion of 60 or more semester hours of course work.

A maximum of 45 semester hours earned in the Division of University S dents may be applied toward a Bachelor's degree in a degree-granting college school of the University. Work done in the Division of University Stude will not be counted toward a graduate degree unless prior written appro obtained from the relevant degree-granting college or school, has been filed the Office of the Dean of the Division of University Students (see page 18

Students transferring within the University are advised to study carefully graduation requirements on pages 49–50 and to note that, unless otherw specified, in all undergraduate divisions, 30 semester hours, including at le *12 semester hours* in the major field, must be completed while registered the school or college from which the degree is sought. Upon transfer student should consult the dean concerned and understand clearly the requi ments he must fulfill.

CREDIT

Credit is given only after registration for a course and satisfactory comple of the required work, or upon the assignment of advanced standing in acco ance with the regulations of the several colleges, schools, and divisions.

Auditing.—A person who has been admitted to the University may registered, with the permission of the instructor, as an "auditor" in a class (academic credit). An auditor is not required to take active part or to p examinations. A student who takes a course as an auditor may not repeat later for credit.

MMER SCHOOL CREDIT

tudent who plans to attend summer school at another institution and apply dit so earned toward graduation from this University must first secure the tten approval of his dean. In no event will credit in excess of what might earned in a similar period in this University be recognized.

LANCE SHEET

request, the Registrar will issue to undergraduate degree candidates a balce sheet showing the amount of work completed and the requirements reining to be met for the degree. A second balance sheet is issued only if the dent changes major or degree objectives.

ANSCRIPTS OF RECORD

ficial transcripts of student records are issued on written request of the stunt or former student who has a clear financial record. A fee of two dollars is arged for each transcript.

ONTINUOUS REGISTRATION

egree candidates are expected to maintain continuous registration until *all* dee requirements are satisfied. Students who have completed course registran (including the thesis) must maintain continuous registration by paying the ontinuous registration" fee (see page 31). By failing to register for one mester or more, the student breaks his registration and must be readmitted ee "Readmission," page 26). A "Readmitted Student" is required to satisfy e curriculum requirements existing at the time of his readmission.
Students must be registered during the summer if they are taking courses, e taking required examinations, are receiving guidance on theses or disrtations, or are expecting to graduate at the end of the summer Sessions.

ILITARY LEAVE

student called to active duty may be granted military leave for the period of tive duty, upon presentation to his dean of a copy of his orders and a petion for such leave. The maintenance of "continuous registration" is not reuired of the student on military leave; however, he must apply for readmison to the University well in advance of the semester in which he expects to turn. Payments for tuition and fees which are not refunded to the student at e time he is granted military leave will be maintained as a deferred credit for s account and use upon his return to the University.

RADUATION REQUIREMENTS

egrees are conferred in February, May, and September.
To be recommended by the Faculty for graduation a student must have met e admission requirements of the college or school in which he is registered; mpleted satisfactorily the scholarship, curriculum, residence, and other reuirements for the degree for which he is registered; and be free from all in-

debtedness to the University. Registration, either for course work or "continuous registration" fee basis, is required for the semester or summ sion immediately preceding the awarding of a degree.

Application for Graduation.—An "Application for Graduation" form be filed and the appropriate fee paid at the time of registration for the mester or summer session of the senior or final year. Students completi gree requirements during the Summer Sessions will be awarded diploma formal convocation) September 30, *provided* they have completed all requirements and have applied for graduation as a part of registration f Summer Sessions.

Scholarship.—The student must meet the scholarship requirements fo particular degree for which he is registered.

Curriculum.—Minimum curriculum requirements for each degree are under the college or school offering work in preparation for the degree.

Residence.—Unless otherwise specified, in all undergraduate divisions University, *a minimum of 30 semester hours, including at least 12 hours major field, must be completed while registered in the school or college which the degree is sought.* This requirement applies to students transfe within the University as well as to students transferring from other institut Unless special permission is granted by the dean of the college or school cerned to pursue work elsewhere, the work of the senior or final year mus completed in the college or school from which the degree is sought.

The graduate student must meet the residence requirements for the partic degree for which he is registered.

National Teacher Examinations.—All candidates for the degree of Bach of Arts in Education are required to take the National Teacher Examinati

Attendance and Conduct.—The University reserves the right to refus confer a degree upon a candidate whose attendance or conduct has been satisfactory.

Thesis or Dissertation.—A thesis or dissertation submitted in partial satis tion of requirements for a degree must be presented in its final form to dean of the college or school concerned no later than the date specified in University Calendar.

Accepted theses and dissertations, with accompanying drawings, become property of the University and are deposited in the University Library, wi the duplicate copies are bound and made available for circulation. See appropriate college or school in this catalogue for regulations governing th and dissertations.

HONORS

WITH DISTINCTION

In all undergraduate divisions of the University the degree may be confe "With Distinction," at the discretion of the faculty, if a student meets the s cific requirements of his college or school, as follows:

1. Columbian College of Arts and Sciences or School of Public and In national Affairs—the attainment of the grades of *A* in 60 per cent of courses taken at this institution; or
2. School of Education or School of Government and Business Admini

—the attainment of a quality-point index of 3.50 or higher in all course
k taken at this institution.
o be eligible a student must have completed at this institution at least one-
of the courses required for the degree.

CIAL HONORS

cial Honors may be awarded by the faculty to any member of the graduat-
class for outstanding achievement in the student's major field on recom-
ndation of the major department. The student must fulfill all of the follow-
requirements:
. He must have his candidacy for Special Honors approved by the faculty
mber representing the major department or field not later than the begin-
g of the senior year.
. He must meet such other conditions as may be set at the time his can-
acy is approved.
. He must have completed at this institution at least one-half of the courses
uired for the degree.
. He must fulfill the specific requirement of the college or school in which
is registered, as follows: (a) Columbian College of Arts and Sciences or
School of Public and International Affairs—attainment of the grades of
or *B* in 50 per cent of the courses taken at this institution; or (b) the
hool of Education or the School of Government and Business Administra-
n—maintain a quality-point index of at least 3.00 on all course work taken
this institution.

PARTMENTAL HONORS

e Department of History offers Departmental Honors if students meet specific
quirements. For details, see the Department of History.

IE LIBRARY

l students registered in the University have the privilege of using the Uni-
rsity Library. Its stacks are open, and all students are welcome to browse at
eir leisure. The current Registration Card must be presented when books are
rrowed for outside use.
The loan period for stack books is 14 days. A fine of 25 cents is charged for
ch day a book is overdue. Any book which circulates is subject to recall by
e Library if needed for reserve or other use. Reserve books must be used
the reserve reading room when the Library is open, except that they may
withdrawn for overnight use beginning at 8:30 p.m. A fine of 50 cents is
arged for each hour or fraction thereof that a reserve book is overdue.
rades of a student are withheld until his library record is clear.
All students using the University Library are expected to be familiar with its
tailed regulations, available at any of the Library's service desks.

GHT TO DISMISS STUDENTS

e right is reserved by the University to dismiss or exclude any student from
e University, or from any class or classes, whenever, in the interest of the
dent or the University, the University Administration deems it advisable.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the to modify or change requirements, rules, and fees. Such regulations sh into force whenever the proper authorities may determine.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs wi notice whenever circumstances warrant such changes.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATIO

The Family Educational Rights and Privacy Act of 1974 applies to institut policies governing access to and release of student education records mainta by educational institutions which are recipients of federal funds. The Unive complies with this statute, which states, in part, that such institutions mus

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such record inaccurate, misleading, or otherwise inappropriate; and
3. receive the student's written consent before releasing information his or her education records to persons outside the University, excep directory information as indicated below. Personally identifiable info tion may be furnished to a student's parents without such written co only upon certification of the student's financial dependency.

The University will release the following directory information upon requ address; telephone number; dates of attendance; school, college, or divisio enrollment; field of study; credit hours earned; degrees earned; and ho received. A student who does not wish such directory information rele must file written notice to this effect in the Office of the Registrar.

University guidelines on the release of student information may be obt from the Office of the Registrar.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property. A "L and Found" Office is maintained on campus in the Safety and Security O

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 554–56) contains regulations recently approved by University's Board of Trustees.

Consortium of Universities of the Washington Metropolitan Area, Inc.

THE UNIVERSITIES in Washington, D.C.—American University, Catholic U versity of America, *George Washington University*, Georgetown Univers and Howard University—are associated in a Consortium through which t

rdinate the use of their respective facilities; District of Columbia Teachers llege, Gallaudet College, Mount Vernon College, and Trinity College are ociate members of the Consortium. Students in approved programs leading degrees in any one of these institutions have the opportunity to select from combined offerings of all the particular courses which best meet their ds.

Participation is limited to campus degree candidates. The following, how-r, are excluded: students in Canon Law, Dentistry, Medicine, and Theology. w students are also excluded from participation, except for candidates for degree of Master of Laws at George Washington University and George-vn University.

In special courses involving private instruction (such as music or art) or orial study, if a special fee is charged, this fee is not covered by the Con-tium agreement and must be paid by the individual student to the institution ministering the course. A student interested in registering for Reserve Officer aining Corps (ROTC) courses should consult the Registrar at his institution. Students are encouraged to study the announcements of programs of all the rticipating institutions. See page 29 for information concerning registra-n for Consortium courses. *A student may not take courses at another insti-ion that are available at his own.*

Registration forms and instructions are available from the registrar of the titution in which the student is enrolled. The student registers and pays at his n institution for all Consortium courses.

The Speech and Hearing Clinic

Director of Speech Pathology and Audiology J.W. Hillis

E SPEECH AND HEARING CLINIC offers diagnostic and remedial work for chil-en and adults with such communication difficulties as stuttering, lisping, cleft-late speech, and cerebral-palsied speech; and with voice, articulatory, and aring problems. Diagnostic and remedial work is also available for persons h nonstandard language usage due to such conditions as hearing loss, brain mage, mental retardation, and environmental factors.

Fees.—The fee for an initial evaluation is $30. Fees for additional specialized ting are dependent on the testing involved. The fees for individual speech hearing therapy range from $3.75 to $15 a session. Fees are reduced for l-time students enrolled in the University and for persons receiving group rapy. Fees are payable at the Office of the Cashier.

The Reading Center

rector Florence E. Hesser

E READING CENTER offers individual diagnostic and corrective services for all els: primary, elementary, secondary, and adult. In addition, special reading

improvement classes are conducted for high school and college stude
well as other adults.

A complete diagnosis includes psychological tests; vision, hearing,
nance, and spelling tests; and various types of reading achievement an
tude tests. Results are interpreted, and a written report is presented i
ference with the parents or the individual.

The special reading improvement classes for high school students,
students, and other adults are offered throughout the year at stated int
Emphasis is placed on improvement of vocabulary, speed, comprehensio
study skills. Instruction in spelling is also provided as needed. Mechanica
such as the tachistoscope, rate accelerator, and controlled reader are av
for increasing speed of comprehension.

Fees.—The fee for individual diagnosis is $90; for individual instructio
a lesson; for semi-individual instruction, $7 a lesson; for instruction in
groups, secondary level, $6 a lesson. Reading classes (15 two-hour ses
are offered for adults, $140; for full-time George Washington University
dents and alumni, $65. Full-time staff employees may contact the Cent
garding special fees. All fees are payable in advance at the Office o
Cashier.

Veterans Educat

THE OFFICE OF THE REGISTRAR, Luther Rice Hall, 2121 Eye Street, N.W.
sists students entitled to educational benefits as veterans, widows, or wa
phans with any problems which may arise concerning their benefits. This O
also processes certification of enrollment and attendance to the Veterans
ministration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans sh
consult the Office of the Registrar prior to submitting application to the V
ans Administration. All such students should obtain the instruction sheet i
by the Office of the Registrar, which sets forth requirements to be fulf
before certification of enrollment can be made to the Veterans Administra
and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D
20421.

University Computer Center

Director R.E. Thomas

THE UNIVERSITY COMPUTER CENTER is located on the first floor of Stuart H
2013 G Street, N.W. The facilities of the Center are available for acade
purposes to all registered students and to members of the instructional s
The Center has as its principal mission the provision of a powerful compu

em which serves the University in its educational, research, and administra-
endeavors. The Center's programming staff concentrates its efforts in con-
ting faculty and staff seminars, consulting with users in the design and
paration of complicated programs, and carrying out computer-oriented re-
rch.

The Computer Center equipment consists of an IBM system 370 Model 145
nputer with large capacity on-line disk storage, a card read/punch, a high-
ed line printer, and four tape drives. A remote Job Entry (RJE) station
lso available. The principal languages available to the user are FORTRAN
COBOL, Programming Language One (PL/I), Assembler Language, and
GOL. In addition, numerous utility, statistical, data manipulation, and
ulation systems and special languages are available in the library of pro-
ms. Facilities are available on a first-come, first-served basis for preparation
programs and data.

Computer programming courses are offered by the School of Government
d Business Administration, the Department of Statistics, and the School of
gineering and Applied Science. In addition, many other departments offer
urses that utilize the computer as a research adjunct to course work.

The Computer Center is normally open 24 hours a day, seven days a week.

ontinuing Education for Women

NTINUING EDUCATION FOR WOMEN CENTER, Suite 621, University Library,
fers individual and group counseling services as well as credit and noncredit
urses and training programs. Brochures are available.

General Alumni Association

E OBJECTIVES OF THIS ASSOCIATION are to unite the graduates who wish to
sociate themselves for charitable, educational, literary, and scientific pur-
ses, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the Uni-
rsity and who have left the University in good standing, or any person who
or has been a member of the teaching, research, or administrative staff of the
iversity, or of the Board of Trustees of the University. Active members are
ose who are life members of the George Washington University General
umni Association or the Alumni Association of any school of the University,
are current contributors to the George Washington University Fund.

All alumni are urged to keep the Alumni Office informed of changes of ad-
ess or occupation and to supply information with regard to their fellow
umni. The Office is located in Alumni House, 714 21st Street, N.W., George
ashington University, Washington, D.C. 20052.

STUDENT LIFE

Vice President for Student Affairs William P. Smith, Jr.
Assistant to the Vice President for Student Affairs Mark Rosenberg
Director of the Cloyd Heck Marvin Center Boris Bell
Dean of Students Marianne Phelps

THE OFFICE OF THE VICE PRESIDENT FOR STUDENT AFFAIRS develops stu life services, policies, and procedures to complement the University's fo instruction program. These activities are implemented through the office the Cloyd Heck Marvin Center, Counseling Center, Dean of Students, Ed tional Opportunity Program, Housing, International Students, Student Activi Student and Alumni Career Services, and Student Health Service.

STUDENT SERVICES

OFFICE OF THE DEAN OF STUDENTS

Dean of Students Marianne Phelps
Assistant Dean of Students Gail Short Hanson

The Office of the Dean of Students provides counseling and information to general student body and assists in program development on campus, par larly in the residence halls. The members of the staff of the Dean of Stud Office are informed on University policies and student services provided campus, enabling them to provide referrals and answers to many questions cerning general student life. Personal letters of recommendation for stud applying to graduate and professional schools can also be obtained from Dean of Students Office. The Dean of Students works with the Adviser International Students, the Director of the Counseling Center, the Director the Educational Opportunity Program, and the Director of Housing in implementation of their programs.

HOUSING

Director of Housing Ann Webster
Assistant Directors of Housing John Bohen, Patricia Phillips

Complete information concerning the University's residence halls is avail from the Director of Housing, George Washington University, Washing D.C. 20052. Information concerning off-campus housing near the Univer also may be obtained at this Office.

Admission to the University does not include a room reservation. The

t will receive, with his notification of acceptance, University residence hall ormation, an application for residence hall space, and a declaration of intent attend the University. The application for residence hall space must be ompanied by a $100 *nonrefundable deposit*. The housing deposit is credited ward the first semester's room charge. Rooms are leased for the academic r, and lease payment must be made by July 15 for the fall semester.

75-76 RESIDENCE HALL RATES PER PERSON FOR TWO SEMESTERS*

r Men:

lhoun Hall

double room	$ 975
triple room	925

r Women:

ong Hall

single room	1,025
double room	975

r Men and Women:

awford Hall (limited to sophomores, juniors, and seniors)—double room	925
tchell Hall (limited to sophomores, juniors, and seniors)—single room	1,025
urston Hall	
double room, triple room, large room for four	975
suite for six	925

aduate Men and Women Only:

aduate Hall—apartment for two and three	1,025
dison Hall—double room	975

OD SERVICE

sident freshmen and sophomores are required to participate in the food vice plan. Freshmen must participate in the seven-day, 20 meals per week n, at the rate of $740* for the academic year. Sophomores may elect either 20-meal plan or a five-day meal plan, 15 meals Monday through Friday, $710* for the academic year. Each plan is optional for junior, senior, and duate students. Food service payment does not cover University intersession vacation periods. All meal cards admit bearer to the dining room in Thurston ll and the second floor contract dining room in the Cloyd Heck Marvin nter.

NSON HALL APARTMENTS

nson Hall is a University-owned and operated apartment house containing one-bedroom and 54 efficiency apartments. Graduate and married students given priority for residency until July 15 each year. Seniors and juniors o have lived at least one year in University residence halls will be consid- d for residency after that date if space is available. All leases are for 12 nths.

*Residence hall prices and allocation and food service prices subject to change.

EDUCATIONAL OPPORTUNITY PROGRAM

Director Abla Yvonne Thomas
Counselor Ronald Whitmore

The Educational Opportunity Program is designed to offer a college edu
primarily to black and other minority students who are graduates of D
of Columbia high schools and/or other qualified District residents. It pr
an opportunity for a student to seek a degree in almost any field and
same time receive academic and or financial assistance.

CLOYD HECK MARVIN CENTER

Director Boris Bell
Assistant Director Donald Cotter
Accountant James Mitchell
Operations Manager Marilyn Mundy

The Cloyd Heck Marvin Center serves as the campus community center.
viding services, conveniences, and recreational and social opportunities
students, faculty, staff, alumni, and guests. Its wide range of facilities pro
the setting for a variety of programs conducted by the University Pro
Board; the departments of Drama, Dance, and Music; and other student
faculty organizations.

The Center Governing Board, representative of all elements of the Univ
community, plays an important role in the day-to-day functioning of the C
This Board works closely with the full-time staff in the development of
cedures and policies which provide a framework for the Center's operati

STUDENT HEALTH SERVICE

Director Sal Fiscina, M.D.

The Student Health Service is an outpatient clinic designed to assist stu
registered on campus with their health needs. This Service is located at 935
Street, N.W. (in the H.B. Burns Memorial Building).

Physicians are available by appointment from 9 a.m. to 4:45 p.m., Mo
through Friday. In addition, physicians are available to walk-in patients
6 p.m. to 10 p.m., Monday through Friday, and from 9 a.m. to 12 noo
Saturday. This schedule is also maintained during the Summer Sessions, ex
that the evening closing hour Monday through Friday is 9 p.m.

For serious emergencies occurring during hours when the Student He
Service is closed, students may go to the Emergency Room of the Univ
Hospital for treatment. This arrangement is for emergency care only, an
fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to re
treatment at the Student Health Service. A student who is not currently
rolled or who has severed his connection with the University is ineligible
medical benefits of the Student Health Service. Any student may engage, if
so desires, physicians and nurses of his own choice, but he will be respons
for all the fees charged. The bills incurred from all services rendered outsi
the Student Health Service (for example, X-ray work and referrals to
cialists or other outside physicians) are the responsibility of the stu

thin the Student Health Service, there will be only a few small charges for
ne services, such as materials for an allergy injection series, overseas im-
nizations, and certain other services.
Any student who intends to train for an athletic team is required to pass a
rough medical examination. The University is not responsible for injuries
eived in intercollegiate or intramural games, or in any of the activities of
Department of Human Kinetics and Leisure Studies.

ALTH AND ACCIDENT INSURANCE

e Student Health Service has arranged for and endorsed group health and
ident insurance, on an elective basis, for those *full-time* students who do
t have other coverage. Interested students should contact the Student Health
rvice Office.

OUNSELING CENTER

rector E. Lakin Phillips
sistant Director **David L. Celio**

e Counseling Center works to enable the campus community to maximally
ofit from instruction by helping students overcome obstacles, anxieties, and
nfusions which hamper learning. Services are offered in three areas: (1)
olution of the individual's educational, vocational, personal, or social prob-
ns through short-term individual or group counseling/psychotherapy, voca-
nal testing, or study skills remediation; (2) training graduate students, resi-
nt assistants, and paraprofessionals, as well as consulting on mental health
ics; and (3) developing innovative methods to aid student growth, such as
diotaped information on undergraduate majors, counseling and therapy
ough written communication, and videotaped counselor skills training.
The Center also administers the Miller Analogies Test, Admissions Testing,
d special assessments for business and industry.
Fees.—Students may request a cost-free interview between 9:00 a.m. and
30 p.m., Monday through Friday (except Friday mornings). If the student
cides to continue the services offered, a minimum fee of $30 will be charged
short-term treatment. However, if financial need is a factor, fee adjustments
n be made.
The Counseling Center is located at 718 21st St. N.W.

TERNATIONAL STUDENTS

viser Ray Clements

ernational House, located at 2129 G St. N.W., is the campus center for stu-
nts from foreign countries. It serves also as the headquarters of the Inter-
ional Students' Society, which seeks to promote international friendship and
derstanding by welcoming to its membership students from all countries,
luding those from the United States.
The International Student Adviser's Office is located in the International
use. It is open each day throughout the school week for consultation on im-
gration regulations and on any matters concerning the social and academic
lfare of students from abroad.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

Director Gertrude McSurely
Assistant Director Gordon H. Gray
Assistant Career Services Counselor Cynthia Walker

The Student and Alumni Career Services Office provides assistance to G. students and alumni seeking full-time, part-time, temporary, or perm employment. All students are urged to become acquainted with the se of this Office early in their college experience.

Counseling concerning trends in employment, areas of employment, va test and examination announcements, preparation for job interviews, res writing, and other procedures for successful job application are always able. Specific career openings; an on-campus recruitment program by bus industry, government, and school systems; volunteer opportunities; and time and temporary jobs for students while attending school are all part o service. Referral and placement functions of the on-campus College Work-S Program are handled by the Student and Alumni Career Services O Teacher credential files initiated by persons seeking employment in all e tional fields are maintained in this Office. Reference files for students app to law schools, medical schools, or other graduate schools are maintaine

An understanding and knowledgeable approach to avenues of service those people who do not find career satisfaction in the structured system business, government, and education is also provided in the Student and Alu Career Services Office.

RELIGIOUS LIFE

The University recognizes the contribution that religion makes to the life o students and encourages them to participate in the various religious organ tions of their own choice. Catholic, Jewish, and Protestant bodies spo various groups and form a link between the University and the religious c munity. The advisers of the religious organizations are available for counse

Religious services in various traditions are provided regularly for the versity community as announced.

STUDENT ACTIVITIES

Director of Student Activities David Speck
Activities and Orientation Coordinator John Perkins
Program Coordinator Leila Lesko
Assistant to the Director Theodora Frisby

The offices of the Vice President for Student Affairs, the Dean of Students, Director of the Cloyd Heck Marvin Center, and the Director of Student Ac ties are responsible for all co-curricular phases of student life.

STUDENT ACTIVITIES OFFICE

The Student Activities Office assists individual students and organizations program development, campus leadership training, and participation in spe projects—both within the University community and in the community at la

is Office also serves as a central clearinghouse for development and maintance of a master activities calendar—for registering and assisting campus ganizations, for scheduling facilities (except in the Marvin Center) and events, d for informing the University community of the many activities and proams which can enrich the educational experience through a variety of weekly, onthly, and annual publications. The Student Activities Office is also responle for coordinating a comprehensive orientation program for new students tering the University. Students interested in participating in the many social, ltural, or extracurricular phases of University life should acquaint themselves th the facilities and functions of the Student Activities Office and its staff.

NIVERSITY COMMITTEES AND ORGANIZATIONS

he George Washington University is an active, working community where udent involvement has become a motivating force in the governance of the niversity through the committee structure. This involvement has helped velop policies and programs beneficial not only to the student population, t to the total University community. While serving on these committees, udent members participate in the formulation and the application of ongoing stitutional policy.

There are numerous committees on which members of the student body are ble to serve. The Student Activities Office has a file on major committees, d interested students should inquire there for further information. Additonal information is also contained in the *Student Handbook*. A brief descripon of some of these committees follows:

Joint Committee of Faculty and Students.—This administrative committee, eated in response to a resolution of the Faculty Senate, is composed of seven culty members, seven student members, and other ex officio members. Memrs of this Committee are appointed by the President.

The Committee is officially charged to "facilitate all efforts to improve udent-faculty relations," to "encourage student recommendations in all areas Senate policy-formulation which affect student life," and to "recommend anges in the 'Rules and Regulations Governing the Conduct of Student fe.'" The Committee has specific advisory powers in many areas concerning udent-faculty relations and the interests of the student body.

Committee on the Judicial System.—The Committee on the Judicial System composed of three faculty members and three student members, one of whom the Chairman of the Student Court, one a student member of the Studentculty Committee on Appeals, and one selected from the campus at large. he Committee on the Judicial System works closely with the Executive cretary to the Judicial System to make sure that the various hearing bodies e efficiently, fairly, and expeditiously conducting their business.

Other committees include the following: the Committee on University Parkg, the Committee on Religious Life, the Committee on Sponsored Research, e Committee on Student Publications, and the Committee on the University ookstore.

ANDING COMMITTEES IN SCHOOLS AND COLLEGES

he schools and colleges maintain various standing committees concerned th specific aspects of the college program; the majority are faculty com-

mittees. One of particular interest to students, the Columbian College Ad
Committee on Honors Program, includes three student representatives
erally chosen from alumni of the sophomore-year honors program. Thi
visory Committee selects leaders for honors seminars in the College, re
independent-study projects, and advises concerning the merits of these pr
Invitations to Committee membership are initiated by the College.

THE STUDENT NOMINATING BOARD

This all-student board was created by the President upon the recommend
of the Joint Committee of Faculty and Students in February, 1971. The B
was established "to make appointments to all University Committees that
student members where there is no other existing means by or through orga
tional charter or constitution to do so."

The members of the Student Nominating Board are the President of M
Board; the President of Omicron Delta Kappa; a student member of the Gr
ate School of Arts and Sciences Advisory Council; and one represent
from each of the following: Residence Hall Association, Engineers' Cou
Joint Committee of Faculty and Students, Student Bar Association, and
ciation of Medical Students.

THE PROGRAM BOARD

The University Program Board, through its student committee structure
membership, provides a variety of cultural, social, and recreational prog
on campus. As a result, students are afforded opportunities to broaden
educational experiences by developing and participating in those prog
which contribute to the life of the University community.

Student membership on the Program Board is composed of four execu
officers (Chairperson, Vice Chairperson, Secretary, Treasurer) elected
the general student body in the spring semester, and five committee c
people appointed after that election. The eight committees of the Prog
Board are the Advisory Council, Art Gallery Committee, Concert Commi
Film-Video Committee, Performing Arts Committee, Public Affairs Commi
Public Relations Committee, and Special Programming Committee. These
dents work with appointed faculty members and professional staff from
Division of Student Affairs in carrying out their many programs and activi

STUDENT ORGANIZATIONS

The following is a representative list of organizations active at the Unive
during 1974-75. More complete information on these and other organizat
is available at the Student Activities Office.

ACADEMIC, DEPARTMENTAL, DIVISIONAL, OR SCHOOL ORGANIZATIONS

American Studies Club, Anthropology Club, Black America Law Stude
Association, Black Engineering Society, Engineer's Council, Enosinian Soci
Eta Sigma Phi, Geology Club, German Club, Health Care Administra
Student Association, Medical School Student Council, Philosophy Club, Russ
Club, Sociology Student Steering Committee, Student Bar Association.

NOR SOCIETIES

hi Beta Kappa.—A national honor society recognizing "outstanding intel-ual capacity well employed" in the field of liberal arts and sciences. Senior junior students who are candidates for the degree of Bachelor of Arts or helor of Science in Columbian College and who have shown broad cultural rests, distinguished scholarly achievement, high character, general promise, scholarly ideals may, to a number not exceeding 15 per cent of a class, be cted to membership by the Faculty members of the Alpha Chapter of the trict of Columbia. Seniors and juniors in other schools of the University o meet the above requirements are also eligible for consideration for mem-rship, provided that their program of studies includes appreciable work in liberal arts.

Sigma Xi.—A national scientific honor society, the purpose of which is to courage original investigation in science, pure and applied. Outstanding duate students in the sciences are eligible for full membership, and under-duates who have shown marked ability in research may be elected to asso-te membership.

Alpha Epsilon Delta.—A premedical honor society.

Alpha Sigma Lambda.—A national honorary society for outstanding scho-tic achievements in part-time, off-campus, evening programs.

Delta Phi Alpha.—A national German honor society.

Delta Sigma Rho-Tau Kappa Alpha.—A national forensic society.

Dobro Slovo.—A national Slavic honor society for graduate and undergradu-e students.

Howard F. Kane-A.F.A. King Obstetrical Society.—An honor society cognizing achievement among medical students in the areas of obstetrics, necology, and reproductive biology.

Mortar Board.—A national society for juniors and seniors stressing leader-ip, scholarship, and service.

Omicron Delta Kappa.—A national society emphasizing leadership in extra-rricular activities.

Phi Delta Kappa.—A national honor society recognizing and promoting dership in the field of education.

Phi Eta Sigma.—A national society, established to encourage and reward gh scholarship and attainment, membership in which is limited to those fresh-en who attain a scholastic average of at least 3.50 or the equivalent.

Pi Delta Phi.—A national French honor society.

Pi Lambda Theta.—A national honor society recognizing excellence in schol-ic achievement and leadership among students in education.

Pi Mu Epsilon.—A national mathematics honorary.

Psi Chi.—A rational psychology fraternity.

Sigma Delta Pi.—A national Spanish honor society.

TERNATIONAL AND CULTURAL EXCHANGE ORGANIZATIONS

ravansary International, East Asian Society, Friends of Canada, Interna-nal Students' Society, Latin American Association, Organization of Arab dents, Students' Cultural Association of India, Student International Medita-n Society, World Affairs Society.

PERFORMING ARTS

Art Gallery Committee of the Program Board; Concert Committee of th
gram Board; Film Committee of the Program Board; George Washingto
versity Dance Company; Performing Arts Committee of the Program
University Chamber Choir, Chorus, Orchestra; University Players. A
of programs is presented by these groups throughout the academic year.

POLITICAL INTEREST ORGANIZATIONS

GW Ripon Society, GW College Young Republicans, GW Young Demo
Young Americans for Freedom, Young Socialist Alliance, Young Soci

PROFESSIONAL ORGANIZATIONS

Alpha Chi Sigma (chemistry), Alpha Kappa Psi (commerce and econom
American Society of Civil Engineers, American Society of Mechanical
neers, Government and Business Administration Doctoral Association, H
Education Association of GW, Institute of Electrical and Electronic Engin
Personnel Society, Pre-Legal Society, Pre-Medical Society, Sigma Delta
(journalism), Student Planning Association, Theta Tau (engineering).

PUBLICATIONS AND COMMUNICATIONS

The Cherry Tree (yearbook), *G.W. Forum* (student-faculty journal), *Poto*
Review (publication of Consortium graduate students), *The Rock Creek* (
ary magazine), *Student Handbook*, *This Month* (listing of major cul
events in the Washington area), *This Week* (weekly listing of scheduled eve
The University Hatchet (semi-weekly newspaper), WRGW (University
station), 676-NEWS (recorded telephone message of daily University a
ties).

RELIGIOUS ORGANIZATIONS

Baptist Student Union, B'nai B'rith Hillel Foundation, Christian Science
ganization, Divine Light Student Association, Eastern Orthodox Club, Ic
Varsity Christian Fellowship, Lutheran Student Association, Newman Fou
tion, Religious Society of Friends, Unitarian-Universalist Club, United C
tian Fellowship, Wesley Foundation.

SERVICE ORGANIZATIONS

B.C. Rides, Circle K, Ecology Action, GW Medical Aid, Project Share
Elizabeths Hospital Project, SERVE, Student Housing Project, Student Vo
teer Action Council.

SOCIAL FRATERNITIES

Delta Tau Delta, Kappa Sigma, Sigma Alpha Epsilon, Sigma Chi, Sigma
Sigma Phi Epsilon, Tau Kappa Epsilon.

L SORORITIES

Gamma, Kappa Alpha Theta, Kappa Kappa Gamma, Phi Sigma Sigma.
hellenic Council includes representatives of all sorority chapters at the
rsity.

AL INTEREST AND ADVOCATE GROUPS

Peoples' Union, Jewish Activist Front, Legal Aid Bureau, Peoples' Union,
Public Interest Research Group (GW Chapter), Student Recruitment
nittee.

TS, HOBBIES, RECREATIONAL ORGANIZATIONS

eur Radio Club, Cheerleaders, Collegiate Bowling Club, Folkdance Club,
ds of Crew, Hockey Club, Military Collectors, Philubious Eggworte
ic).

ATHLETICS AND INTRAMURAL SPORTS

University is a member of the National Collegiate Athletic Association
he Eastern College Athletic Conference. Its teams participate against
r universities throughout the Midwest and Eastern Seaboard. The inter-
iate program is comprised of basketball, baseball, soccer, tennis, golf,
ling, rifle, crew, and cross country.
e University offers a broad program of intramural sports activities for
men and women through the Department of Human Kinetics and Leisure
es.

MAJOR PROGRAM EVENTS

Exhibits.—The work of locally, nationally, and internationally known
is shown in monthly exhibits in the Dimock Gallery in Lisner Lounge
the art gallery of the Cloyd Heck Marvin Center. With the cooperation
e Curator of Art, an annual student art exhibit is presented.
ncert Series.—The Department of Music presents an artist concert series
e concerts each year.
ernational Programs.—The International Students' Society presents an an-
International Dinner in cooperation with foreign embassies and interna-
restaurants. Other programs include regular forums and speakers on
ational topics.
hestra and Chorus Concert Series.—The University Orchestra and Chorus
vo facets of the lively arts available to students either as credit courses or
racurricular activities. The Chorus presents major performances to the
rsity community four or five times a year, including regular Christmas and
concerts. The University Orchestra presents four or five concerts a year.
gram Board Series.—The University Program Board sponsors concerts
emester at which nationally known entertainers perform.

Recreation Program.—The University Recreation Association and
partment of Human Kinetics and Leisure Studies arrange a wide v
sports and recreational activities and special events for all students.

Theatre.—The Drama Department produces seven major plays du
year on the new proscenium/thrust stage in the Dorothy Betts Marvin
or in Lisner Auditorium. Several original and experimental plays
duced in the Experimental Theatre. Students have the opportunity to pa
in all aspects of theatre and may receive credit toward their B.A. or
degrees for some of their production work.

LUMBIAN COLLEGE OF ARTS
D SCIENCES

C.D. Linton
ant Deans Barbara Dunham, J.L. Métivier, Jr.,
Rutledge, H.E. Yeide, Jr.

ULTY*

ssors J.G. Allee, Jr., Joseph Aschheim, Otto Bergmann, L.S. Bowling, F. Bright, Letitia Brown, R.G. Brown, J.F. Burks, W.E. Caldwell, G.V. rroll, I.H. Cisin, A.G. Coates, Jerome Cornfield, T.F. Courtless, Jr., Milton ane, R.H. Davison, Louis De Alessi, A.H. Desmond, Julian Eisenstein, colae Filipescu, J.A. Frey, C.E. Galbreath (*Emeritus*), R.N. Ganz, Jr., . Gastwirth, Marvin Gordon, Samuel Greenhouse, F.S. Grubar, Andrew orgy, R.C. Haskett, P.H. Highfill, Jr., P.P. Hill, J.W. Hillis, H.C. Hinton, H. Hobbs, Mary Holman, Ching-Yao Hsieh, Eva Johnson, W.A. Johnson *esearch*), R.G. Jones, J.W. Kendrick, R.W. Kenny, Hewitt Kenyon, J.C. ng, Virginia Kirkbride, A.D. Kirsch, G.M. Koehl (*Emeritus*), Dean ueger (*Research*), Thelma Z. Lavine, H.L. LeBlanc, L.P. Leite (*Emeritus*), Levitan, B.I. Levy, J.B. Levy, R.K. Lewis, H.W. Lilliefors, C.D. Linton, P.G. Liverman, W.A. MacDonald, Nathan Mantel (*Research*), G.E. Maz-, G.E. McCandlish, M.L. Meltzer, J.L. Métivier, Jr., F.H. Michael, C.C. ndale, R.H. Moore, J.A. Morgan, Jr., J.N. Mosél, C.R. Naeser, David lson, Benjamin Nimer, Kittie Parker, T.P. Perros, E.L. Phillips, Francisco ats, R.E. Purcell, J.P. Reesing, Jr., W.M. Reynolds, J.W. Robb, H.M. har, B.M. Sapin, R.H. Schlagel, W.E. Schmidt, R.P. Sharkey, Lawrence aw (*Research*), Chung-wen Shih, R.H. Shumway, F.R. Siegel, Henry omon, George Steiner, R.W. Stephens, E.L. Stevens, C.T. Stewart, Jr., eodore Suranyi-Unger, Jr. (*Research*), Choy-Tak Taam, Geza Teleki, aus Thoenelt, R.B. Thompson, R.C. Thornton, R.C. Vincent, R.D. Walk, H. Walker, Jr., Dewey Wallace, Jr., R.L. Weintraub, E.R. Weismiller, D.G. ite, R.E. Wood, Helen Yakobson, H.E. Yeide, Jr., A.J. Zuchelli

ct Professors T.E. Bowman, J.C. Broderick, Rose Caron, T.F. Carroll, A. Chace, Jr., J.L. Fisher, Joseph Grunwald, Frederick Gutheim, M.L. es, E.G. Kauffman, L.S. Kornicker, Raymond Manning, J.B. Margolin, . Miller, R.P. Multhauf, J.W. Pierce, H.A. Rehder, I.G. Sohn

iate Professors Eugene Abravanel, D.L. Atkins, Ruth Bari, J. R. Barth, Bielski, A.D. Britt, E.A. Caress, A.E. Claeyssens, Jr., Mary Ann ffland, Linda DePauw, R.M. Dunn, Jr., G.C. Eads, C.F. Elliott, R.S. nch, I.I. Glick, R.S. Goldfarb, V.K. Golla, M.D. Green, W.B. Griffith, . Haber, R.A. Hadley, Dagmar Henney, C.J. Herber, A.J. Hiltebeitel,

---

President of the University, the Vice President for Academic Affairs, the Registrar of the Uni-
the Director of Admissions of the University, and the University Librarian are ex officio
s of the Faculty of Columbian College of Arts and Sciences.

R.W. Holmstrom, R.L. Humphrey, Jr., C.T. Ireland, H.H. Johnso
ing), W.R. Johnson, S.A. Karp, Irving Katz, Young Kim, P.F. Kla
Knowlton, Ruth Krulfeld, C.J. Lange, Myrna Lee, Patricia Len
J.F. Lewis, C.A. Linden, R.C. Lindholm, J.M. Logsdon, W.F.E. L
Lowe, Gregory Ludlow, B.M. Mergen, J.H. Maddox, Muriel McC
C.A. Moser, Nadine Natov, G.A. Olkhovsky, R.K. Packer, W.C
Robert Parris, C.H. Pfuntner, Judith Plotz, J.A. Quitslund, Bernar
R.K. Packer, W.C. Parke, Charles Rice, Philip Robbins, L.A. Rothbla
Rowe, D.A. Rowley, R.C. Rutledge, Pilar Sáenz, S.O. Schiff, Lois Sc
D.E. Silber, Suzanne Simons, W.A. Smith, Leivy Smolar (*Visitin*
Steiner, R.H. Tanck (*Research*), D.H. Teller, R.E. Thomas, Irene
son, N.A. Tilkens, W.L. Turner, C.E. Tuthill, Ruth Wallace, S.J.
R.C. Willson, Lawrence Winkler, R.Y.C. Yin, J.E. Ziolkowski

Adjunct Associate Professors Grose Evans, Edward Gramlich, W.D
Devra Kleiman, C.G. McWright, D.L. Pawson, Mary Rice, Donald
son, C.F. Roper, Joseph Rosewater

Assistant Professors A.D. Andrews II, Ines Azar, Shirley Barnett, J.T.
Margaret Boeckman, G.R. Bozzini, Linda Brandt-Emler, Diane
Alison Brooks, J.A. Bull III, S.W. Burks, Agnes Cannon, Geoffrey
R.L. Cole, R.L. Combs, R.E. Darcy, E.R. Declercq (*Visiting*), J.P. Di
M.S. Duke, Dana Fischer, N.C. Garner, H.I. Gates, H.F. Gillette,
Grant, Fuller Griffith, C.S. Henry, Julia Hicks, Pamela Hoyle (*V*
T.L. Hufford, G.P. Huvé, H.D. Junghenn, R.E. Kennedy, Jr.,
Kessler, N.K. Khatcheressian, Michael King, J.M. Lachin III (*Res*
J.L. Lake, K.J. Langran, D.L. Lee, D.R. Lehman, William Martineau
Nash, H.R. Nau, Elizabeth Neyman, Türker Özdagan, E.O. Pederso
Pires-Ferreira (*Research*), P.J. Poppen, Sonya Quitslund, Joan Regne
Ribuffo, Lilien Robinson, Richard Sines, A.H. Smith (*Visiting*),
Smith-Gill, J.M. Starrels, C.W. Sten, Phyllis Stewart, E.A. Stone
Taragin, J.M. Thibault, D.D. Thornton, J.L. Tropea, J.M. Tubbs,
Wang, W.T. Woodward, J.F. Wright, Jr., Mary Xiroyanni, A.M.
Joanna Zangrando (*Visiting*)

Adjunct Assistant Professors Mildred Deuel, J.K. Kern, Elyse Lehman
Miller, Margaret Tolson, Eileen Zeitz

Instructors David McAleavey, B.K. Netland, V.P. Parady, Gail Paste
Romines, B.W. Sabelli, D.L. Skolnick, Cynthia Walker

COMMIT

DEAN'S COUNCIL FOR FRESHMAN AND SOPHOMORE AFFAIRS†

1975: Lilien Robinson, Bernard Reich
1976: S.O. Schiff, J.E. Ziolkowski
1977: Judith Plotz, R.W. Stephens

---

* The Dean of Columbian College of Arts and Sciences is an ex officio member of all committe
† Elected by the Faculty to serve through the designated year.

S COUNCIL FOR JUNIOR AND SENIOR AFFAIRS*

A.D. Kirsch, D.R. Lehman
R.K. Packer, S.J. Wayne
C.J. Herber, Hewitt Kenyon

MITTEE ON STUDIES

Linton (*Chairman*), A.H. Desmond, P.H. Highfill, Jr., H.L. LeBlanc, Schmidt

MITTEE ON ADMISSION AND ADVANCED STANDING

Perros (*Chairman*), Letitia Brown, M.D. Green, J.L. Métivier, Jr., Charles Robert Walker, Lawrence Winkler

MITTEE ON SCHOLARSHIP

Yeide, Jr. (*Chairman*), Barbara Dunham, J.A. Frey, G.E. Mazzeo, J.L. ier, Jr., R.C. Rutledge, S.O. Schiff, R.C. Vincent

MITTEE ON STUDENT ADVISING

ara Dunham (*Chairman*), Joseph Aschheim, Gregory Ludlow, Elizabeth han, Sonya Quitslund, R.C. Rutledge, W.E. Schmidt, W.A. Smith, E.A. , Klaus Thoenelt, W.L. Turner, H.E. Yeide, Jr.

SORY COMMITTEE ON HONORS PROGRAM

Yeide, Jr. (*Chairman*), Linda DePauw, R.N. Ganz, Jr., W.B. Griffith, Mazzeo, C.C. Mondale, R.B. Thompson, three student representatives

MITTEE ON USE OF CORRECT ENGLISH

Moore (*Chairman*), J.G. Allee, Jr., Muriel McClanahan, R.C. Willson

MITTEE ON PROGRAMS†

Frey (*Chairman*), H.H. Hobbs, R.W. Kenny, R.H. Moore, Bernard Reich, Reynolds, W.E. Schmidt

RVISORY COMMITTEE ON DEGREES ADMINISTERED BY THE COLLEGE ENERAL STUDIES

Rutledge (*Chairman*), D.L. Atkins, F.S. Grubar, C.D. Herber, Mary an, David Nelson, D.G. White

NCIL OF ARTS AND SCIENCES‡

RMAN

Sullivan, Jr. (*University Trustee*), *Thomson & McKinnon Auchincloss ., Washington, D.C.*

---

d by the Faculty to serve through the designated year.
d by the Faculty.
Council serves both Columbian College of Arts and Sciences and the Graduate School of Arts ences. The President of the University, the Vice President for Academic Affairs, the Dean of ian College of Arts and Sciences, and the Dean of the Graduate School of Arts and Sciences officio members of the Council.

MEMBERS OF THE COUNCIL

Windsor P. Booth, *Chief of the News Service, National Geographic S*
Waldron Faulkner, *Faulkner, Stenhouse, Fryer & Faulkner, Washing*
David Edward Finley (*Retired Director of the National Gallery of Ar*
ington, D.C.
Robert R. Garvey, Jr., *Executive Secretary, Advisory Council on Histo*
ervation, Washington, D.C.
Patrick Hayes, *Washington, D.C.*
Jean Ross Howard, *Office of Public Affairs, Aerospace Industries, Wa*
D.C.
Jeremiah Milbank, Jr. (*University Trustee*), *New York, N.Y.*
John Palmer Reesing, Jr., *Professor of English*
Sidney Dillon Ripley II (*University Trustee*), *Secretary, Smithsonian Ins*
Robert Poindexter Sharkey, *Professor of Economic History*
Julian H. Singman, *Attorney, Washington, D.C.*
Louis B. Wright, formerly *Director, Folger Shakespeare Library*

INTRODU

Since its founding in 1821, Columbian College of Arts and Sciences, the arts college of the University, has continued to expand and develop w city of Washington. Its central situation makes participation in the life nation's capital convenient for resident students. The cosmopolitan na the student body reflects the atmosphere of a great world capital. Becau students come from the fifty states and from ninety foreign countries, cl cussions and casual student conversations are enriched by a challenging of viewpoints.

Throughout its history, the College has kept pace with, and often led ments of reform in higher education. Sensitive to the rapidly changing p of student and social needs, notably the increasing maturity and knowle the modern incoming freshman, the College recently inaugurated sw changes in its academic programs. In brief summary, the changes are de to (1) permit the able student to earn his baccalaureate degree in le the standard four years, either by earning credit through a wide var examinations or by performing with excellence within a 90-semester-hour year program; (2) provide each student with a greater opportunity to his own academic program by eliminating almost all specific course re ments except in the major field; (3) encourage an early and close asso between the student and individual faculty members in the field of the st chief interest; and (4) foster a spirit of community and shared respon between faculty and student.

Opportunities exist for double majors; interdisciplinary programs; a the case of the student who finds no existing major or program suitable educational goals, special interdisciplinary programs which may be dev by the student, in consultation with departmental advisers and with th approval of the Committee on Programs.

Columbian College offers programs leading to the degrees of Associ Arts, Bachelor of Arts, and Bachelor of Science: prelegal and premed programs; the first two years of the professional programs in Education Public and International Affairs.

lumbian College has degree-granting authority over certain programs
h combine on-campus and off-campus courses, including the Bachelor of
ce in Geodetic and Cartographic Science (areas of concentration in car-
phy and geodesy) and the Bachelor of Science in Oceanography. Since
of the courses in the first two years of these programs are offered on
pus, students are admitted as regular on-campus students in Columbian
ge. After the first 64 hours, however, most of the courses are offered
ff-campus locations. Students are then transferred to the University's
ge of General Studies, which administers off-campus programs, where
continue to register until graduation. Columbian College also has degree-
ting authority over two other programs which are offered off campus and
inistered by the College of General Studies: Associate in Arts in Special
ies and Bachelor of General Studies (areas of concentration in history,
hematics, political science, psychology, and sociology). For further infor-
ion on all these programs, see the *College of General Studies* catalogue.

E COLUMBIAN COLLEGE PROGRAM

Columbian College program is a contemporary application of the historic
ral arts tradition. Its purpose is to enable the student to develop both his
icular abilities and his general awareness as a human being. It demands of
student a thorough acquaintance with one major area of learning and at
same time an understanding of how that specialization fits into the larger
text of the scientific, social, and moral problems which confront modern
. It stresses not merely expertness but that broadly enlightened expertness
ch encourages its graduates to grow through the years in ability and wisdom.

PHOMORE YEAR IN PARIS PROGRAM

shmen who have received grades of *C* or higher in all course work during
first semester may be eligible to participate in the George Washington
versity-American College in Paris Sophomore Year in Paris Program.
lified students will be encouraged to accept this opportunity to profit from
cultural and intellectual riches of Europe by spending their second year
g and studying in Paris. Credits earned in this Program will be transfer-
e toward a degree in Columbian College of Arts and Sciences. Since all
rses are taught in English, a knowledge of French is not mandatory, but is
rable.

neral Information

RANCE REQUIREMENTS

D CHARACTER and an academic background appropriate for the program of
ies contemplated are required.
equirements for admission to the freshman class are as follows:
An acceptable certificate of graduation from an accredited secondary

school, showing at least fifteen units* which must include four years of E at least two years of one foreign language; two years of science, pre with laboratory instruction; two years of social studies, one of which n American history; and two years of college preparatory mathematics.

2. The principal's statement that the applicant is prepared to undertal lege work.

3. College Entrance Examination Board scores submitted on the Sch Aptitude Test and the English Composition Achievement Test.

It is recommended that the examinations be taken in December or Ja Scores on tests taken in the junior year may be submitted. Arrangemen tests are the responsibility of the applicant and should be made with the cational Testing Service, 20 Nassau Street, Princeton, N.J. 08540; or Center Street, Berkeley, Calif. 94704, not less than one month before the of the test. In applying for the test, the applicant should specify that the be sent to the Office of Admissions, George Washington University, Wa ton, D.C. 20052.

The College Entrance Examination Board tests are preferred; howeve American College Testing battery scores will be accepted. The applicant s request that these scores be sent to the Office of Admissions directly fro American College Testing Program, Iowa City, Iowa. It is recommende the applicant take the tests in October of the senior year.

The Committee on Admission and Advanced Standing will consider th quacy of the qualifications of an applicant who, because of unusual cir stances, does not present all of the formal requirements stated on pages 7 The Committee may prescribe appropriate scholastic-aptitude tests o University.

REGULATIONS

Regulations regarding ADMISSION, REGISTRATION, FEES AND FINANCES *are on pages 21–34; other University regulations, on pages 44–52.*

ACADEMIC WORK LOAD

To encourage academic performance of high quality, the student's work is limited.

A full-time student not on probation may take a course load of as mu 17 semester hours. A student employed more than 20 hours a week w not on probation may take not more than 10 hours.

The amount of work taken by a student on probation may be limited b Committee on Scholarship.

A full-time student who, during the immediately preceding semester, received no grades below *B* and has earned grades of *A* in three courses to at least 9 semester hours may take 18 or 19 hours. An employed student during the immediately preceding semester, has received no grades belo and has earned grades of *A* in two courses totaling at least 6 semester h may take 12 hours.

A student who accepts employment after registration or at any time d a semester must report that fact immediately to the Dean so that his pro may be adjusted, if necessary.

* A unit represents a year's study in a secondary school subject, including in the aggregate than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

ENDANCE

student is held responsible for all the work of the course in which he is tered, and all absences must be excused by the instructor in charge before ision is made for the student to make up work missed.

OF CORRECT ENGLISH

use of correct English, oral and written, is required in all courses. Any ent whose English in any course whatever is deemed unsatisfactory may be rted by the instructor to the Dean and to the Committee on the Use of ect English. The Chairman of the Committee may assign supplementary , without academic credit, varying in amount with the needs of the stu- harged. The granting of a degree may be delayed by failure to make up such deficiency in English to the satisfaction of the Committee and the n.

ORS

phomore Honors Program.—Columbian College offers an honors program selected sophomores. The program is designed to provide an appropriate enge and opportunity for gifted students; to permit early identification of nts with the highest potential for high-quality graduate work and success ompetitive award programs; to introduce educational innovations which possibly be applied at a later date to the student body at large; to bring her a group of students whose activities will enable them to contribute significantly to academic discussion within the University as a whole; o involve superior students in a program unmistakably identified with the l arts ideal of the generally educated man, thus balancing the emphasis on ntrated study that is the heart of existing departmental honors programs. e program normally consists of two honors seminars (see page 351), each d to approximately 15 students. Each seminar carries 3 semester hours edit, and represents elective hours in the student's program. Directors of eminars invite expert faculty members from different fields to assist in ssion of particular problems. Students may elect a program of independ- tudy in place of the second seminar.

rticipants in the Honors Program are selected at the end of their first year e basis of an application to the program. All students who earn four grades or better in their first semester are automatically eligible to apply. Other nts doing high-quality work may apply on the recommendation of two of instructors.

student will have the designation "sophomore honors" entered into his nent record if he (1) completes successfully 2 semesters of honors work 2) earns grades of *B* or better in 16 courses during his first two years of

n's List.—The name of every student who takes a minimum of 15 semes- ours (none of which may be in credit/no credit courses) in any one ter, who receives grades of *A* in at least 60 per cent of the course work in that semester, and who has no grades below *B* for that semester, is on the Dean's List for that semester.

ACADEMIC STANDING

A student who is not suspended or on probation is considered to be
standing.

The following rules governing probation and suspension are appli
stated to students enrolled for a full-time program (12 semester hours o
during the fall or spring semester. Students enrolled for less than 12
hours during the fall or spring semester and students enrolled during t
mer sessions are subject to probation or suspension on the basis of thei
for four courses (3 or more semester hours of credit each), or multiples
rather than on their record in any one semester.

PROBATION

A student who in one semester receives two grades of *F* in courses c
3 or more semester hours of credit each, or the equivalent, is placed on
tion. A student in his first semester on probation who receives one gra
in such a course will be continued on probation for a second semeste
grades of *D* will be treated as equivalent to one grade of *F* in determini
bation. Any grades of *D* or *F* replacing earlier grades of *I* will be consi
part of the record for the semester during which the *I* is removed. A stu
probation taking 12 or more semester hours whose grades are all *C* or b
removed from probation.

SUSPENSION

A student who in one semester receives grades of *F* in three courses c
3 or more semester hours of credit each, or the equivalent, is suspend
student in his first semester on probation who receives two or more gr
F in such courses is suspended. A student who receives one or more
of *F* in such courses in any later semester on probation is suspended
grades of *D* will be treated as equivalent to one grade of *F* in determin
pension. Any grades of *D* or *F* replacing earlier grades of *I* will be consi
part of the record for the semester during which the *I* is removed.

The minimum period of academic suspension is one fall or one spr
mester. Final dates for applying for readmission are the same as thos
erning "Undergraduate Admission" (see pages 21–24). A suspended
seeking readmission must submit evidence to the Committee on Ad
and Advanced Standing that during his absence from the University he
conducted himself as to indicate that he will profit by readmission. A
suspended twice for poor scholarship will not be readmitted.

MID-SEMESTER WARNING

When, at the end of the sixth week of each semester, instructors file in the
of the Dean the names of freshman and sophomore students who are
unsatisfactory work, a notice of Warning is sent to the student and
filed with the appropriate adviser. A "Warning" constitutes notice to th
dent that he should consult his instructor and adviser at the earliest oppor

OMPLETE/AUTHORIZED WITHDRAWAL

nditions under which the grades of *I* (Incomplete) or *W* (Authorized With-wal) may be assigned are described on page 46.

Removing an Incomplete.—The grade of *I* must be removed no later than the day of the examination period for the fall or spring semester immediately owing the semester or summer session in which the grade of *I* is assigned. "Incomplete" that is not removed within this period is automatically changed n *F*. In cases of well-documented extenuating circumstances, an instructor a student may jointly petition the Dean, or the appropriate committee, for itional time in which to complete the work of the course. Such petitions uld be submitted within the same period. The grade of *I* cannot be removed reregistering for the course here, or by taking its equivalent elsewhere.

RRESPONDENCE AND HOME-STUDY COURSES

credit is given for work done by correspondence or in home-study courses.

ASSIFICATION OF STUDENTS

reshman is a student who has completed less than 30 semester hours. tudent becomes a *sophomore* when he completes 30 semester hours. A stu-t becomes a *junior* when he completes 60 semester hours. A student becomes *nior* when he completes 90 semester hours.

n *unclassified student* is one who is not a candidate for a Bachelor's degree rmally because he already holds one), but who wishes for valid academic ons to take a limited program for a limited time. Registration in this status ermitted only with the prior approval of the appropriate Dean's Council.

VISORY SYSTEM

h student is provided with both academic advising and personal counseling. *demic* advising is performed by members of the Faculty selected for their wledge of academic programs, and each student makes up his program in sultation with the adviser assigned to him before registration. A student has *not* selected a major field receives his academic advising from a mber of the Columbian College Committee on Student Advising (see page A student who has officially declared his major field receives his academic sing from the appropriate department, or from an interdepartmental com-ee. *Personal* counseling is available through the Office of the Dean of Stu-s or through the University Counseling Center. All students are encour-to maintain close contact with their advisers.

udents who intend to transfer after the sophomore year to the School of cation or the School of Public and International Affairs are assigned special sers to assist them in planning their programs.

n academic warning system permits early attention to students whose work below required standards. In such cases, students are asked to consult larly with their advisers. On request, copies of academic warnings or pro-n notices may be sent to parents or guardians, who are themselves wel-e to meet with members of the advisory staff.

ACADEMIC ADVISING CENTERS

Each Department has set up Academic Advising Centers where both ge
educational counseling and specific major-field advising are available to
dents. The locations and hours of these Centers may be obtained from de
mental offices.

As the freshman student deliberates his choice of a major, he should co
with faculty advisers in as many of these Centers as he wishes. Once a maj
officially declared, the student then receives all of his academic counseling f
the Advising Center of his major department.

DECLARATION OF MAJOR

The student is encouraged to select and officially declare his major field e
normally no later than the end of the freshman year. To declare his major,
student must secure the proper form from the Office of Columbian Col
take it to his Academic Advising Center, secure the signature of his adv
and return the form to the Office of Columbian College. No student is
sidered to have a major until this process is completed. Thereafter, the stu
receives academic guidance from a faculty adviser in his major-field departm

COLUMBIAN COLLEGE GENERAL COURSE REQUIREMENTS

All candidates for the degree of Bachelor of Arts or Bachelor of Science
admitted to a general arts and sciences curriculum until they declare a m
field. Except for two general course requirements, all curriculum requirem
leading to the degrees of Bachelor of Arts and Bachelor of Science are es
lished by the various major field departments or programs.

The two general requirements are the following:

1. Each student must, during his freshman year, demonstrate ade
achievement in the field of English Composition, either by examination o
taking Engl 9 or 10, and Engl 11 or 12. This requirement may not be
poned.

2. Each student at some point in his college career must undertake a "m
ingful initiation" into the three divisions of knowledge: Humanities, Na
and Mathematical Sciences, and Social Studies. As each major field
normally represent one of these three areas, the requirement may be fulf
by taking no less than 6 semester hours in each of the other two areas. Th
6 credits may be in approved introductory courses, or in approved adva
courses if the student is qualified and receives the instructor's permiss
Applied and "tool" courses do not satisfy the requirement for "meaningful in
tion" into the Humanities. All science courses taken in fulfillment of
"meaningful initiation" requirement must include laboratory instruction. N
mally, these 6-hour units must be taken in a single subject or departm
Courses simply waived (no credit assigned) cannot satisfy the "meanin
initiation" requirements. Columbian College departments and programs
listed below under the three categories.

Humanities	*Natural and Mathematical Sciences*	*Social Studies*
Art	Biological Sciences	American Civilization
*Classics	Chemistry	Anthropology
*East Asian Languages and Literatures	Computer Science	Economics
English	Geology	Geography and Regional Science
*Germanic Languages and Literatures	Mathematics	History
Music	Physics	Journalism
Philosophy	Statistics	Political Science
Religion		Psychology
*Romance Languages and Literatures		Sociology
*Slavic Languages and Literatures		
Speech and Drama		

EQUIRED PLACEMENT EXAMINATIONS

English.—Students whose College Board English Composition Achievement est scores suggest that they will benefit from more intensive training in compositional skills may be assigned to Engl 9 or may be tested in vocabulary, pelling, grammar, standard usage, and writing skill before placement in either ngl 9 or 10. Students whose scores indicate superior competence will be allowed to waive the Engl 10 requirement. Those whose scores indicate markedly perior competence will be allowed to waive both Engl 10 and Engl 11 or 12.

Foreign Languages.—A student who has not been granted advanced standing nd who wishes to continue in college the language begun in high school must ke a placement examination in one of the following: Chinese, French, German, Greek, Hebrew, Italian, Latin, Russian, or Spanish. Upon completion of e examination, assignment is made to the appropriate course.

Mathematics.—New students accepted for registration in Math 30 are required, prior to registration, to take a placement examination in algebra and igonometry; those accepted for registration in Math 51 are required, prior registration, to take a placement examination in algebra.

OREIGN LANGUAGE REQUIREMENT

most major programs requiring foreign languages a student must complete tisfactorily the equivalent of two years of college work in a single foreign nguage.

A student offering for admission four acceptable high school units of a sine foreign language, or the equivalent, is not required to take any foreign lanage.

A student who offers less than four units and wishes to continue the same nguage must take the language placement test.

In many instances foreign languages are required or recommended as reparation for advanced work. The student should consult his adviser so that ppropriate foreign languages may be included, when necessary, in his program.

*Basic language courses (normally the first two years) are considered "tool studies" and are not eptable in fulfillment of "meaningful initiation" into the Humanities.

FIRST- AND SECOND-GROUP COURSES

First-group courses, those numbered from 1 to 100, are intended pri for freshmen and sophomores. Second-group courses, those numbered 101 to 200, are intended for juniors and seniors. However, a qualified fre or sophomore may, with the permission of his adviser and of the depa concerned, take second-group courses. Such qualification is achieved by p or waiving introductory courses or prerequisite courses in the first group.

COURSES IN THE MAJOR FIELD OR DEPARTMENT

Every student is given the opportunity of taking a wide range of libera subjects—Humanities, Natural and Mathematical Sciences, Social Stud both as a means of laying the groundwork for his more concentrated m field study and as a means of determining what academic area is best ad to his interests and aptitudes. In order to enhance this opportunity and to over-specialization once a major has been selected, a maximum limitati 60 hours has been placed on course work taken in the major field or d ment.

PROFESSIONAL COURSES

Except for majors in Applied Mathematics and for students intending to for the combined degree of Bachelor of Arts and Doctor of Medicine, no than 12 hours of professional courses, e.g., courses offered in units o University other than Columbian College, may be included in the hour quired for the Bachelor's degrees in Columbian College. Students electing fessional courses under this rule must obtain the approval of the Dean b registration.

EXPERIMENTAL HUMANITIES/SERVICE-LEARNING PROGRAM

A maximum of 21 semester hours in any combination of Experimental manities courses and Service-Learning Program courses may be credite ward Bachelor's degrees in Columbian College.

EARNING CREDIT OR WAIVING REQUIREMENTS BY EXAMINATION

After matriculation, a student may earn up to a total of 30 semester hou credit, including credits assigned on admission, or waive curriculum req ments, without limitation, in all subject areas except English Composition passing College-Level Examination Program (CLEP) General Examina at the 50th percentile or above. Also, credit may be earned and curric requirements waived, in all subject areas, including English Composition passing Special Examinations provided by the departments of Colu College of Arts and Sciences on an individual basis. *Passing a waiver exa tion does not entitle a student to any semester hours of credit.*

A student may request any department of Columbian College to offer special examination covering the subject matter of any specific course. App is not automatically granted; the student must offer evidence that he has ficient background to have a reasonable command of the subject matter student who has previously taken examinations to waive course require

y not subsequently take examinations for credit in the same courses.) After triculation, credit for CLEP Subject Examinations will not be assigned with- special authorization by the department. However, if a CLEP Subject amination is available, the department may choose to employ it. Assigning dit (advanced placement) or waiver of a requirement by special depart- ntal examinations will depend on the department's evaluation of the exami- ion paper; credit (advanced standing) for CLEP Subject Examinations en with the department's approval will be based on the College Board model licy. Special departmental examinations will normally be of at least three urs' duration. A $25 fee is charged for preparation, administration, and ding of each course examination.

reprofessional Requirements

UDENTS WHO PLAN TO MAJOR in any program offered by the School of Edu- ion or the School of Public and International Affairs are registered during e freshman and sophomore years in Columbian College. Requirements for e first two years of these programs, as well as requirements for the pre- edical program, are listed on the following pages.

EMEDICAL CURRICULUM

premedical student who intends to work toward a Bachelor's degree fulfills e two general requirements of Columbian College (see pages 76–77), and he ay follow the major field curricula of any Columbian College department. ch premedical program must be approved by the premedical adviser. For mission to most medical schools the student must have a minimum of 90 mester hours applicable towards a degree in an approved college of arts d sciences and the 90 hours must include

1. **Biology:** 8 semester hours. This may be either in general biology or zoology t may *not* include separately credited courses in botany.
2. **Chemistry:** 8 semester hours of general inorganic chemistry (which may in- de qualitative analysis), including 4 semester hours of laboratory; and 6 to 8 nester hours of organic chemistry, including laboratory.
3. **Physics:** 8 semester hours, including at least 2 semester hours of laboratory.
4. **English:** 6 semester hours. This may be the usual introductory college course its equivalent.

Many medical schools have additional entrance requirements, among which e courses in biochemistry, embryology, histology, genetics, and mathematics. en where such courses are not actually required, they are strongly recom- nded.

With the exception of these specific requirements applicants are urged to low their personal interests in developing their premedical courses of study. well-balanced program, rather than a specific field, is the criterion by which applicant is judged. It is not advisable to take courses that appear to cover bject matter in the medical program.

While well-qualified candidates are eligible for admission after co the minimum 90 semester-hour requirement, the majority of applic found to be better prepared for the study of medicine after four college work.

EDUCATION CURRICULUM

First two years in preparation for the Bachelor of Arts in Education d the School of Education:

Engl:	Composition—Engl 9 or 10, 11
	Literature—Engl 51–52, 71–72, or 91–92
Math:	Two semesters to supplement senior high school courses chosen from Math 3, 6, 9, and 10
HKLS:	Any combination of first-group courses in the Department of Human Kinetics and Leisure Studies
Psyc:	Psyc 22
	Psyc 29 (for elementary majors) or 112 (for secondary majors)
Science:	Three semesters (2 in biological science and one in physical science or vice versa) to supplement senior high school courses in those fields, chosen from BiSc 3–4 or 11–12; Chem 3–4 or 11–12; Geol 1–2; or Phys 1 and 2, or 9–10. A secondary education major offering for admission 2 or more acceptable senior high school units in the above areas of science may be exempted from one semester of this requirement
Social Studies:	Hist 71–72, or PSc 4 and 6 or 5 and 6
	Six semester hours selected from one of the following combinations: AmCv 71–72; Anth 1–2; Econ 1–2; Geog 51 and 52; Hist 39–40; Hist 71–72; PSc 4 and 6; PSc 5 and 6; or Soc 1 and 2
SPDR:	SPDR 1 (or 11, if the Department so advises)
Elective:	
	Total

HUMAN KINETICS AND LEISURE STUDIES CURRICULUM

First two years in preparation for the Bachelor of Science in Human Ki and Leisure Studies degree with Specialization in Elementary or Secon Human Kinetics and Leisure Studies in the School of Education:

Engl:	Engl 9 or 10, 11
HKLS:	Any combination of first-group courses in the Department of Human Kinetics and Leisure Studies
Psyc:	Psyc 22
	Psyc 29 (for elementary majors) or 112 (for secondary majors)
Math/Science:	BiSc 3–4; Chem 3–4; Geol 1–2; Math 9 and 10; or Phys 1 and 2, or 9–10

		Semester Hours
Social Studies:	Twelve semester hours selected from any two of the following combinations: AmCv 71–72; Anth 1–2; Econ 1–2; Hist 39–40; Hist 71–72; PSc 4 and 6; PSc 5 and 6; Soc 1 and 2	12
SPDR:	SPDR 1 (or 11, if recommended by the Department)	3
Elective:		27
	Total	64–66

st two years in preparation for the Bachelor of Science in Human Kinetics d Leisure Studies degree with a Specialization in Dance in the School of ucation:

Engl:	Engl 9 or 10, 11	6
HKLS:	Any combination of first-group HKLS courses numbering 10–57, and or HKLS 121* and 123†	4
	HKLS 107, 108, 157	9
Psyc:	Psyc 22, 112	6
Math/Science:	BiSc 3–4; Chem 3–4; Geol 1–2; Math 9 and 10; or Phys 1 and 2, or 9–10	6–8
Social Studies:	Twelve semester hours selected from any two of the following combinations: AmCv 71–72; Anth 1–2; Econ 1–2; Hist 39–40; Hist 71–72; PSc 4 and 6; PSc 5 and 6; Soc 1 and 2	12
SPDR:	SPDR 1 (or 11, if recommended by the Department)	3
Elective:		18
	Total	64–66

HINESE LANGUAGE AND LITERATURE‡

ie first two years in preparation for the Bachelor of Arts degree with a major Chinese Language and Literature in the School of Public and International fairs consists of a minimum of 60 semester hours. Each student must, during s freshman year, demonstrate adequate achievement in the field of English mposition, either by examination or by taking Engl 9 or 10, and Engl 11 or . Either while in Columbian College or the School of Public and Interna- nal Affairs, he must also undertake a "meaningful initiation" into the three visions of knowledge: Humanities, Natural and Mathematical Sciences, and cial Studies. As the major field represents one of these three areas, the quirement may be fulfilled by taking no less than 6 semester hours of ap- oved introductory courses, or 6 semester hours in approved advanced urses if the student is qualified and receives the instructor's permission, in e Natural and Mathematical Sciences and in Social Studies. Students must clude in their program of study Chin 1-2, 3-4, and 9; Chin 7-8 and 9; or in 5-6. Chin 5-6 is preferred.

lay be repeated once for credit.
lay be repeated for credit not to exceed four semester hours.
he degree of Bachelor of Arts with a field-of-study major in Chinese Language and Literature is available in Columbian College of Arts and Sciences see page 270).

EAST ASIAN STUDIES OR INTERNATIONAL AFFAIRS CURRICULU

First two years in preparation for the Bachelor of Arts degree in the f
East Asian Studies (China and Japan) or International Affairs in the
of Public and International Affairs:

Engl: Humanities or AmCv:	Engl 9 or 10, and 11 or 12 Art 31–32 or 71–72; *Literature (American, Chinese, East Asian, English, French, German, Greek and Latin, Italian, Slavic, or Spanish); Mus 3, 4; first- or second-group Philosophy courses; Rel 21, 59–60; or AmCv 71–72
†Language:	Chinese, Japanese, French, German, Hebrew, Italian, Russian, or Spanish
Math/Science:	BiSc 3–4 or 11–12; Geol 1–2; Math 9 and 10 or 30 and 31; Phys 1 and 2 or 9–10; or one course selected from Stat 51, 53, 91, and one course selected from Stat 97, 105, 111
Social Studies:	Econ 1–2; Hist 40 and 72; PSc 4 and 6 or 5 and 6
‡Elective:	
	Total

PUBLIC AFFAIRS CURRICULUM

First two years in preparation for the Bachelor of Arts degree in the field
Public Affairs in the School of Public and International Affairs:

Engl: Humanities or AmCv:	Engl 9 or 10, and 11 or 12 Art 31–32 or 71–72; *Literature (American, Chinese, English, French, German, Greek and Latin, Italian, Slavic, or Spanish); Mus 3, 4; first- or second-group Philosophy courses; Rel 21, 59–60; or AmCv 71–72
Language or Statistics:	NOTE: This requirement may be satisfied by 2 years of one foreign language‡ or 12 semester hours of Statistics. Statistics courses taken to fulfill this requirement may not also satisfy the Math/Science requirement below.
Math/Science:	BiSc 3–4 or 11–12; Geol 1–2; Math 9 and 10 or 30 and 31; Phys 1 and 2 or 9–10; or one course selected from Stat 51, 53, 91, and one course selected from Stat 97, 105, 111

* If a student elects 6 semester hours of literature in any foreign language, this cannot be to satisfy the language requirement.
† Chin 5-6 is required for East Asian Studies (China focus) majors; Jap 21-22 is required for Asian Studies (Japan focus) majors. Greek and Latin are not acceptable for International A majors.
‡ Greek and Latin not acceptable for Public Affairs majors.

		Semester Hours
Social Studies:	Econ 1–2; Hist 40 and 71–72; PSc 4 and 6 or 5 and 6	21
*Elective:		7–9
	Total	60

BAN AFFAIRS CURRICULUM

st two years in preparation for the Bachelor of Arts degree in the field of ban Affairs in the School of Public and International Affairs:

Engl:	Engl 9 or 10, and 11 or 12	6
Humanities or AmCv:	Art 31–32 or 71–72; Literature (American, Chinese, English, French, German, Greek and Latin, Italian, Slavic, or Spanish); Mus 3, 4; first- or second-group Philosophy courses; Rel 21, 59–60; or AmCv 71–72	6
Math/Science:	BiSc 3–4 or 11–12; Chem 3–4 or 11–12; Geol 1–2; Math 9 and 10 or 30 and 31; Phys 1 and 2 or 9–10	6–8
	NOTE: If a student elects two years of a foreign language, he may substitute two semesters of Statistics courses for the Math/Science requirement.	
Social Studies:	Econ 1–2, Hist 71–72, and PSc 4 and 6 or 5 and 6	18
	Six semester hours selected from the following:	
*Elective:	Hum 40, 51–52, Soc 2	6
	Students may substitute some of the required courses for the major (see page . . .) for elective courses during the sophomore year	16–18
	Total	60

egree Programs

SSOCIATE IN ARTS DEGREE

HE ASSOCIATE IN ARTS DEGREE may be granted to a student who has completed 0 semester hours in arts and sciences with acceptable grades, and who has fulled the general requirements described on pages 76–77. In addition, the degree ay be awarded to Pre-Education and Pre-Public and International Affairs stuents upon completion of the curriculum specified for the first two years of the ppropriate program. The last 15 semester hours of the program of study ust be completed in residence in Columbian College. A student wishing to eceive this degree must file an "Application for Graduation" form and pay e $10 graduation fee at the time of registration for the semester or summer ssion in which he will complete his requirements.

Credit is not given for courses elected in the Department of Human Kinetics and Leisure Studies.

THE BACHELOR'S DEGREES

Columbian College offers programs leading to the degrees of Bachelor o and Bachelor of Science.

In cooperation with the School of Medicine and Health Sciences a seve curriculum leading to the combined degrees of Bachelor of Arts and Doc Medicine is offered.

REQUIREMENTS FOR THE DEGREES

SCHOLARSHIP

One hundred and twenty hours of course work must be passed and a qu point index of 2.00 achieved in courses graded on a four-point scale. At 60 hours of course work, including the general course requirements o lumbian College, must be taken outside the major-field department or program.

The index is obtained by dividing the number of quality points b number of semester hours of courses passed with grades of *A*, *B*, *C*, which the student submits for graduation. Both the number of quality p and the number of semester hours of courses are based on the stu record at this University. The index is computed as follows: *A*, four poin three points; *C*, two points; *D*, one point; for each semester hour whic student has taken. Courses marked *F*, *W*, *I*, *NC*, or *CR* are not considere determining the index, though courses passed with *CR* count toward the hour overall requirement. (When a formal grade is recorded for an In plete, a grade of *D* or better will be included in the computation of th dex.) A grade of Incomplete which is not removed within one semest automatically changed to an *F*. Grades earned in courses taken at an institution are not considered in computing the index.

RESIDENCE

For the Standard 120-semester-hour Program.—A minimum of 30 sem hours, including at least 12 hours in the major field, must be complete residence in Columbian College. *Unless special permission is granted b Dean to pursue work elsewhere, the work of the senior year must be comp in residence.* This requirement applies to students transferring within the versity as well as to students transferring from other institutions.

For the 90-semester-hour Program.—The last 60 semester hours, inclu at least 12 hours in the major field, must be completed in residence in Co bian College.

Summer work may be counted in residence. For regulations governing stu who are absent from the University for one semester or more, see "Contin Registration," page 49.

RICULUM REQUIREMENTS

hange in degree candidacy within Columbian College (e.g., from Bachelor Arts to Bachelor of Science) requires the permission of the Dean. The ree requirements effective at the time the change is approved must be met. irst-group courses may be required as prerequisites to the major, but ause of their introductory character they cannot be counted as part of such grams. (See "Explanation of Course Numbers," pages 199–200.)

EDIT/NO CREDIT OPTION

junior or senior student in Columbian College who is in good standing may, h the approval of his adviser and the Dean, take one course a semester and eive a grade of *CR*, Credit, or *NC*, No Credit. No student will be allowed take more than four credit/no credit courses under this regulation. He may, wever, in addition receive grades of *CR/NC* in the proseminar for field-of-dy majors and in other courses normally using such grades. A student must n up for the credit/no credit option at registration. Under no circumstances y a student change from credit/no credit status to graded status, or vice sa, after the end of registration. Courses required in the student's major ld (courses required in the major department or those required outside the jor department) may not be taken on the credit/no credit basis. A transfer dent may not choose this option until the second semester of his enrollment this University.

TORIAL STUDY

junior or senior of demonstrated capacity, with a special interest in the bject matter of a *regularly listed course*, may be permitted to take tutorial dy *in residence* under the personal direction of the instructor, in accordance h the rules of the appropriate department and with the approval of the an. Credit under this plan is limited to the specific semester hours of credit signated for each course in the list of courses of instruction. It assumes quent and regular conferences between the student and instructor.

E STANDARD 120-SEMESTER-HOUR PROGRAM

e hundred and twenty semester hours of course work are required for aduation. At least 60 hours of course work, including the requirements stated pages 76–77, 84–85, must be taken outside the major department or pro-m. The student should consult his adviser at each registration about his oice of courses.

Each student should declare his major as soon as he is able, preferably by completion of his 30th semester hour. He may change the major only with consent of the Dean and of the department or committee concerned, and must meet the requirements for the new major in effect at the time the nge is approved.

Students transferring from other institutions or from other schools, colleges, divisions in this University, with major requirements wholly or substantially t, must satisfy the residence requirement of Columbian College (see page).

THE 90-SEMESTER-HOUR PROGRAM

The 90-semester-hour degree program is designed for the exceptionally
student. This program, which leads to the regular Columbian College de
makes it possible to graduate in three normal academic years with a to
90 semester hours of credit instead of the standard 120. Students in this
gram must complete all of the requirements for the three-year degree i
semester in which he achieves his 90th semester hour.

The requirements for this program are (1) 90 semester hours of
earned in college courses (that is, the 90-hour requirement may not b
duced by credit earned through examinations); (2) completion of the c
major-field program and general curricular requirements; (3) grades of
at least 45 semester hours of course work and *no* grades below *C*; (4) at
60 semester hours of credit earned in 100-level courses; and (5) recomm
tion of his major department or program.

To be eligible for this program, the student must show evidence of e
tional academic ability by college record, performance in college courses
other appropriate information.

An interested student should make application directly to his major
departmental chairman or program director as soon as possible, prefe
by the end of his first year of study. His academic record to that point
of course, provide a useful criterion of eligibility.

A transfer student may qualify for graduation under the 90-hour pro
provided he satisfies the residence requirement of Columbian College (see
84), earns grades of *A* in no less than 45 semester hours of course work,
has no grades below *C*.

A student who fails to maintain the required academic performance
studying toward the 90-hour degree program simply continues for the stan
120-hour degree.

BACHELOR OF ARTS

The Bachelor of Arts degree is offered in the following fields:

American Civilization
American Literature
Anthropology
Applied Mathematics
Applied Statistics
Art History
Biology
Botany
Chemistry
Chinese Language and Literature
Classical Archaeology and
Anthropology, studies in
Classical Archaeology and
Classics, studies in
Classical Humanities
Computer Science
Dramatic Art
Economics
English Literature
Environmental Studies
History
Journalism
Judaic Studies
Latin
Latin American Studies
Mathematical Statistics
Mathematics
Music:
Applied Music
Music History and Literature
Music Theory
Philosophy
Physics
Political Science
Psychology
Religion
Russian Language and Literature
Russian Literature and Culture—in Transl
Sociology
Spanish American Literature

he Arts
ench Language and Literature
eography
eology
ermanic Languages and Literatures
Spanish Language and Literature
Speech Communication
Speech Pathology and Audiology
Zoology

OMBINED DEGREES OF BACHELOR OF ARTS AND DOCTOR OF EDICINE

candidate for the combined degrees of Bachelor of Arts and Doctor of Medine must (1) complete the entrance requirements for the Doctor of Medicine egree in the School of Medicine and Health Sciences; (2) complete the general equirements stated on pages 76–77, 84–85; (3) accumulate 90 semester hours the liberal arts, including a minimum of 30 in second-group courses in olumbian College; (4) obtain the approval of the Dean of Columbian College the time of entering the School of Medicine and Health Sciences; (5) obtain he recommendation of the Dean for Academic Affairs of the Medical Center the completion of all prescribed courses in the first year of the School of Medicine and Health Sciences, at which time the degree of Bachelor of Arts vill be conferred (professional work taken at another institution will not atisfy the major requirement of the combined degrees); (6) maintain throughout the entire course the scholarship level required for graduation.

BACHELOR OF SCIENCE

The Bachelor of Science degree is offered in the following fields:

Applied Mathematics
Applied Statistics
Biology
Botany
Chemistry
Computer Science
Environmental Studies
Geology
Mathematical Statistics
Mathematics
Physics
Zoology

THE UNDERGRADUATE MAJOR

There are two types of undergraduate majors: the Field-of-Study Major and the Departmental Major. Five majors, Classical Archaeology and Anthropology, Classical Archaeology and Classics, Environmental Studies, Judaic Studies, and Latin American Studies, although interdepartmental in nature, are governed by the regulations of the Departmental Major.

FIELD-OF-STUDY MAJOR

Each Field-of-Study Major covers a carefully worked out field of coordinated study and is under the supervision of the appropriate department and the Columbian College Committee on Studies.

The Field-of-Study Major requires no specific program of courses, although the student is required to meet the over-all general requirements for the degree. Ability to pass the Major Examination is assumed to be a convincing demonstration that the student possesses the breadth, depth, and quality of knowledge of his major usually defined in terms of semester hours, courses, and grades. Information on each field is obtainable from the department. The

prospective student should place himself under the direction of the appro adviser immediately upon declaring his major.

The Field-of-Study Major places special emphasis on the intellectual opment of the individual student. Programs in the same major may depending upon the individual student's background, previous study, and tudes. The student is expected to consult his adviser frequently, and the cial proseminar offered in some fields gives him further opportunity for vidual advice and direction in pursuing a program especially adapted t needs and abilities. A close student-adviser relationship is essential for the dent's success under the Field-of-Study Major plan.

The following Field-of-Study Majors are offered: American Civiliza American Literature, Chinese Language and Literature, English Litera French Language and Literature, History, Religion, Russian Language Literature, Russian Literature and Culture—in Translation, Spanish Amer Literature, Spanish Language and Literature.

Proseminar in the Major.—A proseminar is offered in most fields to help student acquire a coordinated knowledge of his field through reading, st and laboratory exercises. It is a presentation of the content and methods of major field as a whole through the organization and coordination of the kn edge obtained in the various formal courses in the major subject and of terial not usually included in such courses. This course is not required, bu it is elected, strict attendance is essential. Six semester hours, but no qualita grade, may be assigned. When registered in this course, the student has privilege of visiting, subject to the approval of the instructor, any other propriate course offered in the College. (Regular attendance in a course, ei for credit or as an auditor, requires registration and payment of tuitio Proseminars are open only to the student who has been accepted as a can date under that specific major.

The Major Examination.—The Major Examination will normally be ta at the close of the senior year; a student on a limited schedule may take M earlier than one calendar year before graduation. A student who fails to a Major Examination may, at the discretion of the Committee on Studies re-examined at a later regular major-examination period. The Committee Studies has general supervision of the preparation, reading, and grading Major Examinations. Major Examinations are held each semester on d fixed by the department or departments concerned, but in no case later t December 1 for the fall semester, April 13 for the spring semester, August 26 for the summer sessions.

DEPARTMENTAL MAJORS

Departmental Majors, unlike Field of Study Majors, are defined in terms credit hours, required courses, and the attainment of grades no lower than in the minimum required second-group courses taken in the major field. A *D* required course will satisfy a curricular requirement in the major, but it not count toward the minimum number of hours required in the major. department may require a degree candidate to repeat a required course which he has received a *D*. See pages 43-44.) The minimum specific requi ments for Departmental Majors are listed below the staff of instruction of department concerned. The Chairman of the Department, or designated partmental adviser, should be consulted at registration concerning the

's program of courses; and the entire program, including electives, must approved by the Department. The student is also expected to consult the irman or adviser in all matters affecting his program of studies, such as nges, substitutions, or withdrawals, and especially concerning his progress is course. A close student-adviser relationship is desirable.

Departmental Majors are offered in the following: American Literature, Anpology, Applied Mathematics, Applied Statistics, Art History, Biology, any, Chemistry, Classical Archaeology and Anthropology (interdepartntal), Classical Archaeology and Classics (interdepartmental), Classical Huities, Computer Science, Dramatic Art, Economics, English Literature, vironmental Studies, Fine Arts, Geography, Geology, Geology (engineering ion), Germanic Languages and Literatures, History, Journalism, Judaic dies, Latin, Latin American Studies (interdepartmental), Mathematical Stacs, Mathematics, Music (Music History and Literature, Music Theory, Aped Music), Philosophy, Physics, Political Science, Psychology, Sociology, eech Communication, Speech Pathology and Audiology, Zoology.

UBLE MAJORS

th the prior approval of the departments concerned, a student who comtes the requirements of two major fields in Columbian College (for exple, Mathematics and Physics, or English and Latin, or History and Ecomics) may graduate with a double major. Such a student should consult th advisers in the two departments concerned and officially declare both ajors on the appropriate forms available in the Dean's Office. A double ajor must be taken in departments offering the same degree (either the B.A. the B.S.); a major field in Columbian College cannot be combined with a ajor field offered by another degree-granting unit of the University.

TERDISCIPLINARY PROGRAMS

Regular Interdisciplinary Programs.—Several programs presently exist, inding American Civilization, Classical Archaeology and Anthropology, Classi Archaeology and Classics, Environmental Studies, Judaic Studies, and Latin merican Studies.

Special Interdisciplinary Programs.—A student who finds no existing major program suited to his educational goals may develop a special major proam of his own, in consultation with appropriate departmental advisers. Final proval of such a program rests with the Committee on Programs. Only proams with valid and clearly defined academic goals will be approved, and ch shall be designated by a title suggested by the student to the Committee Programs for approval. Because of their broad scope, such interdisciplinary ajors may not be combined with a double major.

GRADUATE SCHOOL OF ARTS AND SCIEN

Dean Henry S
Assistant Deans E.A. Caress, D.A.

FACULTY AND CONSULT

FACULTY*

Professors L.F. Affronti, F.D. Allan, J.G. Allee, Jr., R.C. Allen, Aschheim, J.M. Bailey, Otto Bergmann, L.S. Bowling, H.F. Bright, Brown, R.G. Brown, J.F. Burks, W.E. Caldwell, G.V. Carroll, Marie C I.H. Cisin, A.G. Coates, V.H. Cohn, Jr., Jerome Cornfield, T.F. Cou Jr., Milton Crane, R.H. Davison, Louis De Alessi, A.H. Desmond, Eisenstein, Nicolae Filipescu, J.A. Frey, C.E. Galbreath (*Emeritus*), Ganz, Jr., J.L. Gastwirth, Marvin Gordon, C.M. Goss (*Visiting*), S Greenhouse, F.S. Grubar, Andrew Gyorgy, R.C. Haskett, P.H. Highfi P.P. Hill, J.W. Hillis, H.C. Hinton, H.H. Hobbs, Mary Holman, J.C. H Ching-Yao Hsieh, Rudolph Hugh, Eva Johnson, T.N. Johnson, R.G. J.W. Kendrick, R.A. Kenney, R.W. Kenny, Hewitt Kenyon, J.C. King Kirsch, Thelma Z. Lavine, H.L. LeBlanc, L.P. Leite (*Emeritus*), Sar Le B.I. Levy, J.B. Levy, R.K. Lewis, H.W. Lilliefors, C.D. Linton, T Liverman, W.A. MacDonald, H.G. Mandel, Paul Mazel, G.E. Ma G.E. McCandlish, M.L. Meltzer, F.H. Michael, J.W. Millar, F.N. Mille C.C. Mondale, J.A. Morgan, Jr., J.N. Mosél, C.R. Naeser, David N Benjamin Nimer, Kittie Parker, T.P. Perros, Vladimir Petrov, E.L. Ph Francisco Prats, R.E. Purcell, J.P. Reesing, Jr., J.W. Robb, Mary L Robbins, H.M. Sachar, B.M. Sapin, R.H. Schlagel, W.E. Schmidt, Sharkey, R.H. Shumway, F.R. Siegel, Gaston Sigur, Arthur Smith (*Visi* B.W. Smith, R.S. Snell, Henry Solomon, George Stambuk, J.E. Sp George Steiner, R.W. Stephens, C.T. Stewart, Jr., Choy-Tak Taam, Teleki, Klaus Thoenelt, R.B. Thompson, Richard Thornton, C.S. Th Elizabeth Tidball, C.R. Treadwell, E.B. Truitt, Jr. (*Research*), G.V houny, R.D. Walk, R.H. Walker, Jr., Dewey Wallace, Jr., R.L. Weim E.R. Weismiller, Mario Werner, D.G. White, R.E. Wood, Helen Yako H.E. Yeide, Jr., A.J. Zuchelli

Adjunct Professors T.E. Bowman, J.C. Broderick, F.A. Chace, Jr., E.G. Kr man, J.W. Pierce, H.A. Rehder, I.G. Sohn

* The President of the University, the Vice President for Academic Affairs, the Registrar University, the Director of Admissions of the University, and the University Librarian are ex members of the Faculty of the Graduate School of Arts and Sciences.

sociate Professors Eugene Abravanel, E.N. Albert, Yousef Al-Doory, D.L. Atkins, Ruth Bari, A.D. Britt, E.A. Caress, Mary Ann Coffland, Linda DePauw, R.M. Dunn, Jr., G.C. Eads, C.F. Elliott, R.S. French, I.I. Glick, V.K. Golla, M.D. Green, W.B. Griffith, S.E. Haber, R.A. Hadley, Dagmar Henney, C.J. Herber, R.W. Holmstrom, Kun-yen Huang, R.L. Humphrey, Jr., C.T. Ireland, M.J. Jackson, W.R. Johnson, S.A. Karp, Irving Katz, S.G. Kent, Young Kim, Phyllis Kind, P.F. Klarén, Philip Klubes, R.E. Knowlton, Marilyn Koering, R.A. Lavine, Myrna Lee, Patricia Lengermann, J.F. Lewis, C.A. Linden, R.C. Lindholm, J.M. Logsdon, W.F.E. Long, J.C. Lowe, Gregory Ludlow, Henry Merchant, B.M. Mergen, C.A. Moser, Nadine Natov, G.A. Olkhovsky, R.K. Packer, W.C. Parke, Robert Parris, C.H. Pfuntner, Judith Plotz, J.A. Quitslund, Bernard Reich, Melvin Reich, Charles Rice, D.A. Rowley, Pilar Sáenz, S.O. Schiff, Lois Schwoerer, D.E. Silber, Suzanne Simons, Carl Steiner, J.A. Straw, D.H. Teller, Irene Thompson, N.A. Tilkens, C.E. Tuthill, G.A. Walker, Ruth Wallace, D.W. Watkins, S.J. Wayne, R.Y.C. Yin, B.C. Zook

djunct Associate Professor C.G. McWright

ssistant Professors F.P. Abramson (*Research*), A.D. Andrews II, Ines Azar, Shirley Barnett, J.T. Bennett, Alison Brooks, J.A. Bull III, S.W. Burks, Ann Butler, J.W. Dailey, R.E. Darcy, Rosalie De Giovanni-Donnelly (*Research*), G.S. Edwards, Linda Gallo, N.C. Garner, H.I. Gates, H.F. Gillette, Jr., Fuller Griffith, H.C. Harder, T.L. Hufford, C.B. Jacobson, H.D. Junghenn, N.K. Khatcheressian, D.R. Lehman, D.E. Morse, W.G. Nash, H.R. Nau, M.D. Olson, E.O. Pederson, J.M. Starrels, C.W. Sten, Phyllis Stewart, E.A. Stone, M.F. Taragin, D.C. Thornton, E.H. Williams, W.T. Woodward, J.F. Wright, Jr.

EAN'S COUNCIL*

lenry Solomon (*Chairman*), A.D. Britt, R.M. Dunn, Jr., P.P. Hill, R.G. ones, E.N. Kassira, H.W. Lilliefors, G.E. McCandlish, D.E. Silber, C.R. readwell

ONSULTANTS IN RESEARCH

nton Allen, Elizabeth Anderson, W.F. Anderson, Franklyn Arnhoff, Julius xelrod, J.L. Barnard, Joan Blanchette-Mackie, Roscoe Brady, Jr., B.B. Brodie, rthur Brown, Dean Burk, H.M. Cathey, Norman Cheville, Bruce Collette, rminio Costa, Lois-ellin Datta, P.R. Datta, Barend de Vries, G.A. Eddy, J.M. spinosa, Harold Finley, Alan Franklin, Victor Frattali, J.E. Fredland, F.N. renkiel, Robert Gibbs, Jr., Joseph Goldstein, James Granger, R.E. Greenfield, r., T.J. Greenwalt, Gordon Guroff, Edward Haeskaylo, John Hardt, H.F. laviland, Jr., J.E. Hazel, Ronald Herberman, E.L. Hove, F.M. Hueber, Thelma lunt, William Jakoby, Kurt Jankowsky, L.C. Johnson, J.C. Jones, M.L. Jones, .K. Kahn, Meir Kende, Milton Kern, David Kohne, Robert Land, Otto andman, M.S. Legator, Elsie Lewis, Darrell Liu, W.M. Lovenberg, Rose Mage, larriet Maling, M.J. Malone, S.B. Marley, Jr., G.R. Martin, L.I. Marton, arry McGowan, Walter Mertz, John Minna, Mortimer Mishkin Arturo

*The President of the University and the Vice President for Academic Affairs are ex officio members the Dean's Council.

Morales-Carrion, Sean O'Reilly, John Parker II, John Pisano, Christo
Polge, Michael Potter, Herbert Rabin, Marco Rabinovitz, D.P. Rall,
Raskin, Farrell Robinson, Carl Romney, Jack Rosenbluth, Philip Ru
Andras Sandor, Padman Sarma, L.P. Schultz, D.B. Scott, J.E. Seegmiller, A
Shelokov, W.A. Shropshire, Jr., R.S. Sigafoos, H.K. Skramstad, Jr., L.B. S
Leon Sokoloff, Helmuth Sprinz, D.F. Squires, B.F. Steinbruckner, R
Stern, R.B. Stevens, Robert Stewart, Sarah Stewart, T.D. Stewart, K.K.
moto, John Thomas, L.J. Tilly, A.J. Tousimis, W.W. Tullner, Jr., Nor
Ture, Ernest Umberger, Srikrishna Vadlamudi, John Van Buren, Ric
Veech, Herman Viola, Robert Vogel, Ludwig von Sallmann, W.E. Washb
Marion Webster, Hans Weil-Malherbe, Herbert Weissbach, Ruth Wittler,
Wolbarsht, Oktay Yenal, R.A. Young, L.E. Zimmerman

FIELD OF STUDIES CONSULTANTS

Robert Allen, Wallace Bowman, Cary Carson, Grose Evans, Alan F
Joseph Fulton, F.R. Goff, Alan Jabbour, J.B. Kuiper, Philip Lundeberg, Ver
McKay, Robert Sauer, J.W. Witherell

HISTORY AND ORGANIZATI

The Graduate School of Arts and Sciences is responsible for advanced s
and research leading to Master's degrees and the degree of Doctor of Phil
phy in the arts and sciences. Graduate programs at George Washington
versity were first formally organized under a graduate School in 1905, fol
ing several decades of gradual growth in a number of departments. In 1
the Graduate School was discontinued. Columbian College, the Univers
liberal arts college, then assumed responsibility for the Master of Arts
Master of Science degrees, and a newly created Graduate Council adm
tered all Doctor of Philosophy programs. Professional schools took respo
bility for advanced degrees in the professional fields.

In 1967 the Graduate Council and the Graduate Division of Columb
College were consolidated into a new Graduate School of Arts and Scien
All graduate programs in the arts and sciences leading to the degrees of Ma
of Arts, Master of Arts in Special Studies, Master of Fine Arts, Master
Forsenic Sciences, Master of Music, Master of Science, Master of Science
Teachers, Master of Science in Forensic Science, Master of Science in Spe
Studies, and Doctor of Philosophy are under the Graduate School.

In addition, a Master of Philosophy degree is awarded by the School, u
recommendation of the appropriate department, to students who have succes
fully completed the General Examination for the Doctor of Philosophy deg

The School is under the direction of the Graduate Faculty of Arts and
ences. It is the responsibility of the Faculty to set the requirements for ad
sion to the School, to provide courses and programs of study and research
its students, to establish academic standards for its degrees, to recommend
the Board of Trustees the awarding of degrees, to lay down regulations
needed for the operation of the School, and generally to supervise its activi

The administration of the School is vested in the Dean, who is Chairman
the Dean's Council, which is responsible to the Faculty of the School for
policy matters.

DMISSION REQUIREMENTS

pplication forms for admission to graduate study are obtained from the Office the Dean of the Graduate School of Arts and Sciences. When completed, ese application forms must be submitted to this Office, together with college anscripts and letters of reference.

Applicants must have academic backgrounds of excellence, usually with ma-rs, or equivalent, in the fields in which they intend to study for advanced egrees. Normally, a *B* average (or equivalent) from an accredited college is equired. With evidence of special promise, such as high Graduate Record xamination scores, an applicant may be accepted whose academic record alls short of *B*. The minimum does not assure automatic acceptance. The epartments may, and often do, set higher admission standards. Moreover, he number of spaces available for new graduate students limits the number hat can be accepted. Students who apply in their senior year must have com-leted their baccalaureate work before registration in the Graduate School and nust present evidence of such completion. Students whose native language is ot English are required to take the *Test of English as a Foreign Language* TOEFL), administered by the Educational Testing Service, Princeton, N.J.

Application for Admission.—Completed applications and requests for fellow-hip support must be submitted by February 15 (February 1 for students in Clinical Psychology and Art Therapy) for admission in the fall semester and by November 1 for the spring semester. Applications for graduate study are acceptable after these dates for admission in the corresponding semester and will be reviewed if time permits and if space is available in the program desired.

Readmission.—A student who has failed to maintain continuous registration and wishes to resume his graduate program must file an application form to be considered for readmission. Readmission is not guaranteed, and the appli-cation is subject to review by the department concerned and the Dean. The student may be required to take qualifying examinations on the course work completed. Application forms are available in the Graduate School Office.

REGULATIONS

Regulations regarding ADMISSION, REGISTRATION, FEES AND FINANCES *are stated on pages 21–34; other University regulations, on pages 44–52.*

In addition, the Graduate School publishes a Student Handbook each aca-demic year which contains updated information on the School's policies, regu-lations, and other matters of concern to enrolled or admitted students. It is the responsibility of the student to be aware of the information contained in the catalogue and handbook.

GRADES

Grades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; *CR*, Credit.

The symbol *I* (Incomplete) indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work for a course. The "Incomplete" must be made up before the lapse of one cal-

endar year. An "Incomplete" which is not removed within one calendar remains as a grade of *I* on the student's record. The grade of *I* cannot removed by reregistering for the course here, or by taking its equivalent where.

The grade of *I* is also given for all thesis and dissertation research cou until the thesis or dissertation is completed. Upon the satisfactory comple of the thesis or dissertation the grade *I* is changed to *CR* automatically. grade of *CR* is given for an *Advanced Reading and Research* (usually bered 398) course.

SCHOLARSHIP REQUIREMENTS

Graduate students are expected to maintain a minimum accumulative gr average of *B* (3.00) in all course work in the program of studies. Indivi departments may require a higher average. The fields of Art History, Engl History, and Psychology require a 3.25 average.

In the case of a student who receives a grade of *F* for a course in his p gram of studies, the Graduate School will require a written statement from department justifying the student's continuance in the Graduate School outlining the program to be followed. Continuation is contingent upon Dean's approval. A course in the program of studies for which an *F* is ceived cannot be subsequently removed from the program even though other course is taken as a substitute.

A student may repeat for credit a course in which he has received a gr of *C* or above *only when permitted to do so by the department concern* unless the course description states that the course may be repeated for cre A written statement to this effect must be submitted for approval to the De Office by the appropriate departmental adviser. It is then filed with Registrar.

A graduate student may take an advanced undergraduate course (cou numbered 101-200) for graduate credit only upon the approval of the D and the department at the time of registration. Such approval is granted o with the provision that students complete additional work in order to rec graduate credit.

PROGRAM OF STUDIES

The program of studies must be approved by the departmental adviser and in the Graduate School Office no later than November 1 for graduate stude entering in the fall semester, or March 15 for graduate students entering in spring semester. A program of studies may be revised, when necessary, by taining the approval of the departmental adviser and the Dean. The revis must be filed in the Graduate School Office.

CONTINUOUS REGISTRATION

All students must maintain continuous registration while working toward a gree, except during the summer session. If continuous registration is not main tained, the student is dropped from the degree program unless leave of absen is granted by the Graduate School.

AVE OF ABSENCE

a student is temporarily unable to continue his program of studies, he may quest leave of absence for a specific period of time, not to exceed one cal-dar year. An exception is made for students granted Military Leave. A stu-nt who is called to active duty may be granted Military Leave (see page 47) r the duration of his period of military duty upon presentation to the Grad-te School of a copy of his orders and a request for such leave. When the riod of leave has expired, it is the student's responsibility to notify the Grad-te School at least two months in advance of a given registration period of s intention to reregister. If he fails to reregister, his candidacy is terminated.

ITHDRAWAL

raduate students who intend to withdraw from the Graduate School should form the School in writing. The last day for *complete* withdrawal without ademic penalty is at the end of the eighth week of classes.

RADUATION REQUIREMENTS

ll students must file an "Application for Graduation" form and pay the re-uired graduation fee at the time of registration for the last semester or sum-ner session of the final year in which they intend to graduate. The student must e registered in the Graduate School during the semester he plans to graduate. Master's and doctoral candidates may graduate in May, February, or Septem-er. A student who has completed the requirements for a degree but has not et been awarded the degree will be issued a letter to this effect upon request.

EGREES

isted below are the degree programs of the Graduate School of Arts and Sci-nces and the specific degrees offered, by field. The programs are directed by he departments concerned. Degree programs which bridge two or more de-partments are directed by committees composed of members of the depart-nents concerned. For further information write to the Dean or the chairman of the appropriate department.

The degrees of Master of Arts in Special Studies and Master of Science in Special Studies are designed for students who do not wish to concentrate in a specific field such as those listed below, but instead are interested in inter-disciplinary programs. It is possible to group several of these fields together to make an interdisciplinary program; the program of studies is determined by the student in consultation with the Special Studies Program Steering Com-mittee. The student may choose courses from those fields that he feels are per-tinent to his academic goal; however, he cannot have more than one-third of the courses from any one department. The student must obtain permission to take the courses from the appropriate departments.

The Graduate School of Arts and Sciences offers programs of study on campus leading to the degree of Master of Arts in Special Studies with con-centrations in Criminal Justice (see page 313), Women Studies (see page 500), and Philosophy and Social Policy (see pages 405–6). The School also offers Master of Arts and Master of Science in Special Studies degrees in specific academic areas at off-campus locations (see page 104).

GRADUATE FIELDS

The graduate course work offered in support of the degree programs i
following list is shown by department in this CATALOGUE.

Subject	Degrees Of
I. Humanities	
American Civilization	M.A.
American Literature	M.A.
Art:	M.F.A.
Ceramics	
Design	
Graphics	
Painting	
Photography	
Sculpture	
Art History	
Classical Archaeology, Classics, and History	M.A.
Dramatic Art	M.A.
English Literature	M.F.A.
*French Literature	M.A.
Germanic Languages and Literatures	M.A.
History of Religions	M.A.
Music:	M.A.
Applied Music	Mus.M.
Conducting	
Music Theory	
Musicology	
Philosophy	M.A.
Religion	M.A.
Religion and Medical Care	M.A.
Religious Education	M.A.
Russian Language and Literature	M.A.
*Spanish American Literature	M.A.
*Spanish Literature	M.A.
	M.A.
II. Social Sciences	
Anthropology	
Economics	M.A.
Education Policy	M.A.
Geography	
History	M.A.
†International Relations	M.A.
Political Science	
Sociology	M.A.
	M.A.
III. Physical and Mathematical Sciences	
Applied Mathematics	M.A., M.S.
Applied Statistics	M.S.

* Any approved combination of French, Spanish, or Spanish American Literature is available
Doctor of Philosophy field.
† The School of Public and International Affairs offers a Master of Arts field in International

Subject	Degrees Offered	
Chemistry	M.S.	Ph.D.
Forensic Sciences	M.Forens.S., M.S. in Forens.S.	
Geochemistry	M.S.	Ph.D.
Geology	M.A., M.S.	Ph.D.
Mathematical Statistics	M.A.	Ph.D.
Mathematics	M.S. for Teachers, M.A.	Ph.D.
Physics	M.A.	Ph.D.
Biomedical and Related Sciences		
Anatomic Pathology	M.S.	
Anatomy		Ph.D.
Art Therapy	M.A.	
Biochemistry	M.S.	Ph.D.
*Biological Sciences	M.S.	Ph.D.
Genetics	M.S.	Ph.D.
Human Ecology		Ph.D.
Microbiology	M.S.	Ph.D.
Mycology	M.S.	
Pathology		Ph.D.
Pharmacology	M.S.	Ph.D.
Physiology	M.S.	Ph.D.
Psychology	M.A.	Ph.D.
Speech Pathology and Audiology	M.A.	

OMBINED MASTER OF SCIENCE AND DOCTOR OF MEDICINE DEGREES

idents interested in the combined degrees of Master of Science and Doctor Medicine must meet the requirements for admission to the Graduate School Arts and Sciences and to the Doctor of Medicine degree program of the hool of Medicine and Health Services.

The Master of Science program consists of a minimum of 30 semester hours credit and the fulfilling of the tool requirement (see pages 99–100). A aximum of 12 semester hours of credit for graduate-level courses *completed a part of the Doctor of Medicine degree curriculum* (and not already applied ward the Bachelor's degree) will be allowed in fulfillment of the requirements the Master of Science degree. The remaining 18 semester hours of work, hich in most programs includes a thesis, must be work in the basic medical iences normally required for a Master of Science degree in the Graduate hool of Arts and Sciences.

UAL PROGRAM FOR THE DOCTOR OF MEDICINE AND OCTOR OF PHILOSOPHY DEGREES

dual program is available to qualified students who seek both the Doctor of edicine and Doctor of Philosophy degrees. The requirements which must be lfilled for both degrees are identical to those currently and separately estab- shed in the School of Medicine and Health Sciences and the Graduate School f Arts and Sciences.

A student working toward these degrees may apply a maximum of 24

*Biology, Botany, and Zoology.

semester hours of approved course work in the School of Medicine and
Sciences toward the minimum of 48 hours of course work required to
for the General or Cumulative Examination for doctoral candidacy
course work is normally taken during the semesters that alternate w
medical program and in the years following the award of his M.D.
The student's research for the dissertation may begin concurrently with t
24 semester hours of graduate course work leading to the General or
lative Examination. The estimated time for the completion of this dual pr
is six years.

In order to enter the dual degree program, a prospective student firs
apply for and gain admission to both the Graduate School of Arts and S
and the School of Medicine and Health Sciences separately through esta
procedures. Upon admission to both schools, he may then apply for aff
with the dual degree program. Work toward the Doctor of Philosophy
is performed under the jurisdiction of a *departmental* Doctoral Comm

REQUIREMENTS FOR THE DEG

THE MASTER'S PROGRAMS

Most of the requirements listed below are applicable to candidates for t
grees of Master of Arts, Master of Arts in Special Studies, Master o
Arts, Master of Forensic Sciences, Master of Music, Master of Science, M
of Science for Teachers, Master of Science in Forensic Science, and Ma
Science in Special Studies.

1. *General Requirements.*—For a Master's degree program *includ*
thesis, the satisfactory completion of a minimum of 30 semester hours
proved graduate work, including 6 semester hours of thesis research, is req
For a Master's degree program which does *not* include a thesis, the num
semester hours of approved graduate course work is determined by the d
ment, and normally consists of from 30 to 36 semester hours. The pro
without the thesis is not an individual student option and is not availa
every department. Departments can and often do set requirements abo
minimum required by the Graduate School. The program of study leading
degree of Master of Arts in Special Studies or Master of Science in Spe
Studies consists of 36 semester hours of approved graduate course wor
does not require a thesis.

Work taken to make up deficiencies is never counted as part of the re
ments leading to a Master's degree. Upon approval, up to one-half of t
quired graduate work may be taken in courses offered by the other affi
institutions of the Consortium of Universities of the Washington Metrop
Area, Inc., or by another degree-granting division of this University. If
is transferred from another institution (see "Transfer of Credit," page
number of semester hours which may be taken at an affiliated Consor
institution is reduced by the number of hours accepted as transfer credit D

It is expected that a full-time Master's candidate will complete degre
quirements within 3 years and that a part-time Master's candidate will co
degree requirements within 4 years. Extensions beyond these time perio
quire approval of a written request.

Academic Work Load.—Full-time students register for 9 to 12 semester
s each semester; part-time students register for 6 semester hours each se-
ter. These requirements do not apply when a student has fewer than 9
ester hours (full-time) or 6 semester hours (part-time) remaining to com-
e his program. No more than 15 semester hours may be taken during any
semester.

Transfer of Credit.—A maximum of one-quarter of the semester hours
raduate course work required for a degree may be approved for transfer to
Graduate School from the Division of University Students, another degree-
nting division of this University, or another accredited college or university
er the following conditions: the course work must have been taken prior
dmission to the Graduate School, it must be approved as part of the stu-
t's program of studies, it must not have been applied to the completion of
irements for another degree, it must be post-baccalaureate graduate-level
rse work, it must have been taken within the past two years, and the stu-
t must have received a grade of *B* or better. This action must be approved
a "Request Form" by the departmental adviser and the Dean. A transcript
he course work must be on file before the request can be considered.

Tool Requirement.—Except for candidates for the degrees of Master of
s in the field of Art Therapy, Master of Arts in Special Studies, Master of
s in the field of Speech Pathology and Audiology (nonthesis option), Master
Forensic Sciences, Master of Music, Master of Science in Anatomic Path-
gy, Master of Science in Forensic Sciences, and Master of Science in Special
dies; candidates for Master's degrees in the Department of Mathematics; and
didates in the field of Dramatic Art for the degree of Master of Fine Arts,
ster's candidates normally must complete successfully a tool requirement in
oreign language, mathematics, statistics, or computer programming. In
ce of a tool requirement, candidates for the degree of Master of Fine Arts
the fields of Ceramics, Design, Graphics, Painting, Photography, or Sculp-
e will complete a methods course selected by the Department of Art.
The tool requirement examination should be passed prior to the beginning
the third semester of graduate work; students who have not fulfilled this
uirement must register for the appropriate course at the beginning of the
rd semester. Courses taken to satisfy the tool requirement cannot be counted
the semester-hour requirement for the Master's degree. No Master's candi-
te may attempt a tool examination more than three times. A tool requirement
filled at another university cannot be used to fulfill the requirement at this
iversity.

With the approval of the department directing the student's program of study,
tool requirement may be selected from the following options:

(a) Passing a foreign language reading examination (a student may register
r the appropriate reading course for nonmajors or make arrangements with
e appropriate department to take the examination on the scheduled dates). A
dent majoring in a foreign language may not select that language to satisfy
is requirement; a student whose native language is not English may elect
nglish as the tool (students choosing English should contact the English
partment).

(b) Completing with a grade of *B* or better a course in mathematics, sta-
tics, or computer programming which is approved by the appropriate de-
rtment and by the Graduate School; or passing a special examination cov-

ering the approved course material, administered by the appropriate ment, at the level of the final examination.

5. *The Thesis.*—The main purpose of a Master's thesis is to demo the student's ability to make independent use of the information and t acquired through his other disciplines and to furnish objective evidence constructive powers in his chosen field. The student registers for 6 se hours of thesis research and must complete the thesis no later than three dar years after his initial registration. The student must maintain cont registration during the period required to complete the thesis. Registrati thesis research entitles the student to the advice and direction of the mem the faculty under whom the thesis is to be written. The thesis subject m approved by the professor who will be directing the thesis. The thesis final form with one copy and a certificate of approval signed by the director and at least one departmental reader, must be presented to the no later than the date announced in the University Calendar. All theses meet the form, style, and other requirements set forth in a pamphlet, *In tion Concerning Theses and Dissertations*, available in the Office of the

6. *Master's Comprehensive Examination.*—Most Master's degree cand must pass a Master's Comprehensive Examination in the major subject aminations are held on dates fixed by the departments, so that results filed in the Graduate School Office no later than the day before the meets to approve the list of graduates.

A student who fails to pass the Master's Comprehensive Examination in exceptional circumstances, and with the approval of the department a Dean, repeat the Examination at the next scheduled Examination date. fails a second time, no further opportunity to take the Examination is per

THE DOCTOR OF PHILOSOPHY PROGRAM

The minimum requirements for the doctoral program are as follows:

1. *General Requirements.*—The program leading to the degree of Do Philosophy requires the satisfactory completion of a minimum of 72 se hours of approved graduate work for entering students whose highest degree is a baccalaureate. A minimum of 48 of these hours must be ta preparation for the General Examination. Entering students whose earned degree is a Master's degree are required to register for a minimum semester hours of approved graduate work, no fewer than 24 of which taken in preparation for the General Examination. While completing th sertation portion of the program, the student must register for 12 to 24 se hours of *Dissertation Research*, depending on the number of hours com prior to the General Examination. The exact number of semester ho quired for any part of the total program is assigned by each departme may exceed the minimum required by the Graduate School.

2. *Academic Work Load.*—Full-time students register for 9 to 12 se hours each semester; part-time students register for 6 semester hours semester. These requirements do not apply when a student has fewer semester hours (full-time) or 6 semester hours (part-time) remaining t plete his program.

3. *Transfer of Credit.*—Entering students who do not hold a Master gree may request transfer of up to 24 semester hours of credit toward toral degree for acceptable post-baccalaureate graduate work taken

ter's degree level at George Washington University or another accredited ege or university.

Tool Requirements.—As early as possible, and *before* completion of the eral Examination, the tool requirements specified in the program of study t be completed. The following rules apply to students permitted to elect or (c) below: students entering the Graduate School with a Bachelor's ree must satisfy the first tool requirement before completion of 15 semester rs of course work; students entering with a Master's degree must satisfy the tool requirement no later than the second semester of registration as a ctor of Philosophy student. Courses taken to fulfill the tool requirement not counted in the semester-hour requirement for the Doctor of Philosophy ree program. The tool options are as follows:

(a) two foreign language reading examinations;

(b) high-level proficiency in one foreign language;

(c) one foreign language reading examination and the completion with a de of *B* or better of a course in mathematics, statistics, or computer pro- mming which is approved by the appropriate department and by the aduate School. It is possible to satisfy the latter part of the requirement by ssing a special examination covering the approved course material, adminis- ed by the appropriate department, at the level of the final examination.

A doctoral student whose native language is not English may not elect his tive language to meet a foreign language examination requirement. With the proval of his department, he may elect English to fulfill the language require- ent in any of the options listed above except (b). The student who is given proval to take a language examination in English should make arrangements th the Department of English.

A doctoral student may omit a tool preparation course at George Washing- n University if he has had a similar course at another college or university. owever, his proficiency in that tool must be validated by an examination at is University.

Further details for meeting the various tool requirements are stated in the raduate School's Student Handbook.

5. *The General Examination.*—Each student is required to complete the eneral Examination no later than the semester following the completion of urse requirements. The General Examination is composed of a written ex- nination 5 to 6 hours in length in each of the areas of study comprising the udent's total program; the time permitted between each examination is deter- ined by the administering department. Some departments permit one or two eas of study to be "written off"; that is, a special, shorter examination is ven after a year of course work in the area. A cumulative examination sys- m is in effect in the fields of Chemistry and Physiology, and in the field of sychology a system of two comprehensive examinations is used. Students in ese fields should consult the appropriate department for information about s system.

6. *The Degree of Master of Philosophy.*—Upon departmental recommenda- on, the degree of Master of Philosophy may be awarded to students who have uccessfully completed all requirements for the Doctor of Philosophy degree p to and including the General Examination. Not all departments recommend udents for this degree.

7. *The Dissertation and Final Examination.*—A dissertation is required of

each doctoral candidate as evidence of his ability to perform scholarly re and interpret its results. The candidate normally enrolls for *Dissertatio* ***search*** upon completion of the General Examination; however, he may r for up to one-half of the required number of semester hours of *Disse* ***Research*** during the time the General Examination is being completed. the required number of hours of *Dissertation Research* has been taken, i time is needed to complete the dissertation, the student must maintai tinuous registration (see page 49) each semester until the dissertation ished and the Final Examination is passed. If the dissertation is not com within 5 years from the date the General Examination is completed, th dent will be required to retake the General Examination.

No later than the date specified in the University Calendar, the can must submit to the Dean the original and one copy of the dissertation a abstract for inclusion in the Announcement of the Final Examination a reproduction by University Microfilms, Inc.

When the dissertation has been approved by the Director and two me of the Doctoral Program Committee and filed with the Dean, the can takes the Final Examination, an oral examination which is open to the p A committee of examiners (composed of Graduate School Faculty and, appropriate, outside scholars) conducts the Examination. If the can passes, he is recommended by the Graduate School for the degree of D of Philosophy.

Detailed information regarding regulations for the form and reproduct the dissertation is available in the Office of the Dean. The successful can for the doctorate is required, before receiving his degree, to pay a fee to the expense of printing the Announcement of the Final Examination, an the basic service rendered by University Microfilms, Inc.

POSTDOCTORAL ST

George Washington University doctoral graduates may continue any stud the University without payment of tuition, and enjoy all University lib privileges. Such graduates are required to pay the usual "continuous reg tion" fee and the University Center fee in order to establish their active bership in the University. The use of laboratory space and equipment is tingent upon availability, and the cost of all laboratory or special library terial is paid by the graduate. Special arrangements for such privileges m made with the Dean two months in advance of the semester in which graduate wishes to register. Postdoctoral work taken under this privilege not be applied toward any degree offered by the University.

FELLOWSHIPS AND FINANCIAL

A limited number of graduate teaching fellowships are available in mos partments of instruction to students registered in the Graduate School of and Sciences. Other kinds of sponsored and University awards are avail but limited.

Students applying for admission who also wish to apply for a fello should submit the fellowship application and the application for admissio

ruary 15; the necessary transcripts, Graduate Record Examination scores, letters of recommendation should also be on file by this date. Students ently enrolled in the Graduate School should submit only the fellowship lication and have current letters of recommendation on file by February 15. orms are available at the Office of the Graduate School of Arts and Sci-es. Filing the fellowship application entitles the student to consideration for awards available in his department.

Students who wish to apply for loans should indicate their intent to do so the application for admission. Information concerning loans is contained a booklet, *Student Financial Aid*, available from the University's Student ancial Aid Office.

OPERATIVE PROGRAMS

e American Studies Program at George Washington University is affiliated h the American Studies Program of the Smithsonian Institution. This ar-gement offers the student in the field of American Civilization an oppor-nity to take advantage of the Washington environment. Members of the staffs the Smithsonian's American Studies Program, Museum of History and Tech-logy, National Portrait Gallery, National Gallery of Art, and National Gallery Fine Arts offer seminars and tutorial instruction in fields which provide the dent with an unusual opportunity to develop new dimensions in the discipline American Civilization. This program of study is open to students working ward the degrees of Master of Arts and Doctor of Philosophy, and is intended prepare them for research, teaching, and museum-related careers.

The Department of Art at George Washington University and the Smithson-n Institution offer a joint graduate program of study and research in museum udies leading to the degree of Master of Arts in the field of Art History with concentration in Museum Training. The Department has also established a ogram of study in affiliation with the Textile Museum, the Corcoran Gallery Art, and area private art galleries.

A program of study leading to the degree of Doctor of Philosophy in merican Civilization with emphasis on library research and collections is fered jointly by George Washington University and the Library of Congress. he coordinator of the Library Program and his staff offer an orientation minar and other courses and supervise students in reading and research nd in work on such library problems as indexing, cataloguing, and bibliog-aphy.

For further information concerning these programs contact one of the follow-ng offices at George Washington University: the Graduate School of Arts and ciences for those who are interested in any of the fields listed above, the Department of Art for those interested in Museum Training, the American tudies Program for those interested in the American Civilization field.

George Washington University, in cooperation with three other regional niversities and the Folger Shakespeare Library, has established the Folger nstitute for Renaissance and 18th Century Studies as a cooperative venture n graduate studies in the humanities. Seminars (limited to twelve students each) are offered each semester under the direction of outstanding American and oreign scholars. The Folger Library is the physical center for the Institute. All

participants enrolled in the seminars are granted access to the collections o books, manuscripts, and reference materials of the Library. There are al portunities for participants to establish personal relationships with the f and readers at the Library, in the furtherance of their research. All regi students are eligible to apply for admission to one or more of the semina though priority in enrollment will be accorded to graduate students worki dissertations and to postdoctoral scholars from the sponsoring institutions

Further information, including a listing of seminar topics, is available Office of the Graduate School of Arts and Sciences of George Washi University or at the Folger Shakespeare Library.

The University and the National Bureau of Standards have entered cooperative agreement to further educational opportunity at both the U sity and the Bureau. This arrangement holds great promise for graduate and research, particularly in the physical sciences.

SPECIAL OFF-CAMPUS DEGREE PROGR

The Graduate School of Arts and Sciences is currently offering the follo special degree programs off campus: (1) the degree of Master of Arts in S Studies with areas of concentration in Criminal Justice, Higher Educ Affairs, Legislative Affairs, or Urban Learning, and (2) the degree of M of Science in Special Studies with area of concentration in Telecommuni Operations.

The Graduate School has academic jurisdiction over these off-campus grams which are administered by the College of General Studies. For d consult the Graduate School of Arts and Sciences.

CHOOL OF EDUCATION

an Rodney Tillman
sistant Dean R.E. Baker
ecutive Assistant to the Dean L.H. Kornhauser

ACULTY*

ofessors J.G. Allee, Jr., R.E. Baker, J.G. Boswell, Perry Botwin, J.L. Breen, Marcella Brenner, W.T. Carroll, Mary Ellen Coleman, L.H. Elliott, R.J. Frankie, R.G. Hanken, Donald Hawkins (*Research*), Eva Johnson, Virginia Kirkbride, A.D. Kirsch, Anthony Marinaccio, Leonard Nadler, Martha Rashid, Carol St. Cyr, Daniel Sinick, Loretta Stalling, Rodney Tillman, C.E. Vontress

ssociate Professors S. Leigh Clark, R.S. Cottrell, Jr., A. LaVerne Dickerson (*Research*), Lyndale George, Gloria Horrworth, Rita Ives, E.P. Kulawiec, Donald Linkowski, Margaret McIntyre, Dorothy Moore, S.R. Paratore, Ruth Peterson, Jeanne Snodgrass, G.D. Wiggs, Lawrence Winkler, Maida Withers

djunct Associate Professor D.C. Paup

ssistant Professors M.S. Castleberry, R.E. Cipriano (*Research*), J.A. Greenberg, Janet Heddesheimer, Nancy Johnson, J.A. Kuhagen (*Research*), Honey W. Nashman, R.W. Prouty, Charles Reeder, (*Research*), J.R. Shotel, G.W. Smith, Linda Tsantis

structors Sue Hoth (*Research*), Joan Landy, Nancy Sobel

EMBERS OF THE ADVANCED GRADUATE FACULTY

.E. Baker, J.G. Boswell, Perry Botwin, J.L. Breen, Marcella Brenner, W.T. arroll, R.S. Cottrell, Jr., L.H. Elliott, R.F. Frankie, Gloria Horrworth, Rita es, Virginia Kirkbride, A.D. Kirsch, Donald Linkowski, Anthony Mariaccio, Dorothy Moore, Leonard Nadler, Ruth Peterson, Martha Rashid, Carol . Cyr, Daniel Sinick, Loretta Stallings, Rodney Tillman, C.E. Vontress, G.D. Viggs, Lawrence Winkler

OMMITTEES†

HE DEAN'S COUNCIL‡

974: Perry Botwin, Leonard Nadler
975: Donald Hawkins, C.E. Vontress
976: Rita Ives, Janet Heddesheimer

The President of the University, the Vice President for Academic Affairs, the Registrar of the niversity, the Director of Admissions of the University, and the University Librarian are ex officio embers of the Faculty of the School of Education.
The Dean and the Assistant Dean of the School of Education are ex officio members of all committees.
Elected by the Faculty in the year designated to a three-year term.

COMMITTEE ON ADMISSION AND ADVANCED STANDING*

Rodney Tillman (*Chairman*), Perry Botwin, J.L. Breen, Donald Linkowski, Ruth

COMMITTEE ON SCHOLARSHIP

Rodney Tillman (*Chairman*), Perry Botwin, J.L. Breen, Donald Linkowski

INTRODUCTI

It is the purpose of the School of Education to prepare teachers, counse and administrators for leadership responsibilities, and to offer experien teachers opportunities to extend their education. The School includes the partments of Education, Human Kinetics and Leisure Studies (*formerly Ph cal Education*), and Special Education. It offers both graduate and un graduate work. Other departments of the University provide general educa and subject-matter courses needed for a well-balanced program of teacher cation.

Individually planned programs are provided for liberal arts and other lected graduates who wish to prepare for teaching. The School also prov a wide range of courses to provisional teachers who wish to qualify for te ing certificates and teachers who wish to renew licenses. Degree program adult education, college student development, generic counseling, higher edu tion, human resource development, rehabilitation counseling, therapeutic rec tion, and tourism and urban recreation administration are offered.

Laboratory and clinical facilities are provided by the University Read Center and Speech and Hearing Clinic. In cooperation with public and priv schools and a wide variety of social agencies, ample opportunity for field perience is provided.

In addition to a full schedule of weekday courses during the academic y classes are offered in the evening, on Saturday, and during the summer.

HISTORICAL DEVELOPMENT

The University began offering professional courses for teachers in 1904-5, in 1907 it established a Division of Education. In 1909, the Division of Ed cation became the Teachers College, which in its early years was concern largely with the teacher preparation on the undergraduate level. In 1928, Teachers College became the School of Education, and greater provision w made for advanced study. Graduate enrollment has steadily increased, and tod the School has a considerably larger number of graduate than undergradu students.

* Appointed by the Dean.

EDUCATION FOR TEACHERS

rograms are planned to provide a broad general education, adequate mastery f the teaching-field content, and professional competence. The relative emhasis placed on each of these depends on the student's teaching-level plan. or example, elementary school teachers, since they teach all subjects, need reparation of greater breadth and less specialization than secondary school eachers.

Adequate preparation for teaching requires an acceptable minimum of four ears of full-time study. Five years terminating in a Master of Arts in Educaion degree are needed for superior preparation which will command higher alaries and opportunities for promotion. During the first two years, the student s registered in Columbian College of Arts and Sciences, the liberal arts college f the University, where he acquires the background of general education so ssential to success as a teacher. Here he is assigned a special adviser from he School of Education to assist in planning his program.

REGULATIONS

Regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are tated on pages 21–34; other University regulations, on pages 44–52.*

ACADEMIC WORK LOAD

UNDERGRADUATE

Fifteen to 17 semester hours of credit constitute a normal program. A student with a quality-point index of 3.00 or higher may, with the permission of the Dean, enroll for 18 or 19 hours. No student may enroll for more than 19, except by permission of the Committee on Scholarship.

A student employed 15 hours or less a week may carry a normal program of college work.

A student employed from 16 to 25 hours a week may enroll for 12 or 13 hours. With a quality-point index of 3.00 or higher he may, with special permission of the Dean*, enroll for 14 to 16 hours.

A student employed from 26 to 34 hours a week may enroll for 9 or 10 hours. With a quality-point index of 3.00 or higher he may, with special permission of the Dean* enroll for 11 to 13 hours.

A student employed 35 hours or more a week may enroll for 6 or 7 hours. With a quality-point index of 3.00 or higher he may, with special permission of the Dean*, enroll for 9 or 10 hours.

A student who increases his hours of employment after registration or at any time during a semester must report immediately to the Dean so that his program may be adjusted, if necessary.

GRADUATE

Students employed full-time may take a maximum of 6 semester hours, unless special permission to take more is granted by the Dean.*

* Request forms are available at the Office of the Dean. They should be filled out and returned to the Dean at least two weeks prior to Registration.

EARNING CREDIT BY EXAMINATION

Undergraduate and graduate students may earn semester-hour cred to a maximum of 24 hours by performing satisfactorily on College-Lev amination Program Tests (CLEP) or Special Examinations—provid the departments of Columbian College of Arts and Sciences on an indi basis. *Passing a waiver examination does not entitle the student to any ter hours of credit.*

College-Level Examination Program (CLEP).—CLEP offers two typ examinations:

1. CLEP Subject Examinations are offered in 29 subject areas. These measure achievement in the equivalent of specific college-level courses. may not be earned by passing the examination after having taken the equi course.)

2. CLEP General Examinations are offered in five areas: mathematics. sciences, humanities, the natural sciences, and English composition. (Cre advanced standing—is not given for the General Test in English Composit

Credit will be noted on official transcripts of the George Washi University for students who achieve scores above the 50th percentil CLEP examinations as described in the CLEP Registration Guide may be obtained from the University Counseling Center, 718 21st S N. W. Examinations are always administerd on the third Thursday of month.

Students interested in becoming certified to teach who have earned b lor's or graduate degrees in fields other than education may satisfy some tification requirements by taking CLEP or Special Subject Examinations.

See pages 78–79 for additional information on Special Examinations o by departments.

The Bachelor's Degr

THE SCHOOL OF EDUCATION OFFERS UNDERGRADUATE PROGRAMS leading t degrees of Bachelor of Arts in Education and Bachelor of Science in Hu Kinetics and Leisure Studies.

The program of each student must be approved by a faculty adviser. S each student's program is defined by his particular needs, it is important the student have a clear concept of his major interest in education, and that he be familiar with the teaching-certificate requirements of the locality which he expects to teach.

ENTRANCE REQUIREMENTS

Bachelor of Arts in Education and *Bachelor of Science in Human Kine and Leisure Studies.*—The satisfactory completion of the appropriate first year curriculum in Columbian College of Arts and Sciences (see pages 80–8 or the equivalent from another accredited educational institution with a qua point index of at least 2.25 or the equivalent, is required. Applicants must an application for formal admission to the School of Education. This form be obtained from the Office of the Dean, the School of Education, Geo

shington University, Washington, D.C. 20052. In addition to filing an appli-ion, out-of-state applicants must provide the School of Education with at least e letter of reference from instructors who know them. Candidates in the pre-ication curriculum in Columbian College and residents in the Washington, C., metropolitan area must arrange for an interview by calling the Office of Dean, in addition to filing the application. At the admissions interview, ap-cants must exhibit personality traits that give promise of success as a teacher. e-education majors in Columbian College, who may be admitted tentatively ter completing 45 semester hours or fully after completing 60 hours, must o be recommended by their pre-education adviser.

In addition to the regular admissions interview, an interview with the Special ducation program adviser is required of applicants interested in Special Edu-tion.

EQUIREMENTS FOR THE DEGREES

o be recommended for a degree a student must satisfy the admission, resi-ence, scholarship, and curriculum requirements.

ESIDENCE

andidates for the Bachelor's degree must complete satisfactorily while in the chool of Education a minimum of 30 semester hours.

For full details concerning continuous registration, see page 49.

CHOLARSHIP

For the system of grading and of computing scholarship, see pages 46–47.

In order to graduate, a student must have a quality-point index of at least 2.25.

Probation.—A student who fails to maintain a quality-point index of at least 2.25 is placed on probation. He remains on probation as long as his index is below 2.25, or until his probation is removed by the Committee on Scholar-ship.

Suspension.—A student on probation who fails to raise his index to 2.25 within the time specified may be suspended.

A student suspended for poor scholarship may, within ten days, appeal his case to the Committee on Scholarship through the Dean. If the case appears to be remediable and the student seems likely to improve his scholarship, the Committee may readmit him on probation. A student denied readmission may again, after a lapse of a calendar year, petition the Committee through the Dean for readmission. A student suspended twice will not be readmitted.

CURRICULUM REQUIREMENTS

In all Bachelor's curricula at least 30 semester hours must consist of courses numbered above 100.

INCOMPLETE/AUTHORIZED WITHDRAWAL

Condition under which the grades of *I* (Incomplete) or *W* (Authorized With-drawal) may be assigned are described on page 46.

Removing an Incomplete.—Although the grade of *I may* remain o records for a maximum of one year, the instructor should normally set a briefer period within which the uncompleted work (usually the final examin or a required paper) must be made up. The grade of *I* cannot be remov reregistering for the course here, or by taking its equivalent elsewhere. An complete" cannot be made up after the lapse of one calendar year excep written permission of the Dean's Council. An "Incomplete" which is no moved within one calendar year is automatically changed to an *F*.

CREDIT/NO CREDIT OPTION

A junior or senior student who has a cumulative quality-point index of or better, may, with the approval of his adviser and the Dean, take one cou semester and receive a grade of *CR*, Credit, or *NC*, No Credit, which wi recorded on the student's transcript but will not be reflected in his qua point index. No student will be allowed to take more than 4 credit/no c courses. A student must sign up for such an option at registration. Unde circumstances may a student change from credit/no credit status to gr status, or vice versa, after the end of registration. Courses required in student's major field may not be taken on the credit/no credit basis. A tr fer student may not choose this option until the second semester of his en ment at this University.

BACHELOR OF ARTS IN EDUCATION

The objective of programs leading to the degree of Bachelor of Arts in Ed tion is to provide (1) general educational backgrounds; (2) functional c mand of ideas, concepts, knowledge, and skills in one or more teaching fie (3) mastery of basic professional information and skills adequate for the beg ning teacher; and (4) development of attitudes needed for success in teach

The general educational backgrounds needed by prospective teachers are tained through precollege education, college courses, work experience, lead ship activities, student campus activities, and off-campus cultural opportuni

Normally, from 63 to 66 semester hours of the total requirement are co pleted in Columbian College of Arts and Sciences of this University or in equivalent institution elsewhere (see "Education Curriculum," pages 80–8 Since the teaching fields differ in content, scope, and complexity, some progra are longer than others.

Work experience, leadership activities, participation in student campus acti ties, and *the utilization of off-campus cultural opportunities.*—As part of form course work and on their own initiative, students of the School of Educati are expected to take full advantage of the many opportunities in the Washi ton area for developing leadership skills. Advisers are available to help stude plan these experiences.

NATIONAL TEACHER EXAMINATIONS

All candidates for the degree of Bachelor of Arts in Education are required take the National Teacher Examinations. Students receive individual repo of test scores and may avail themselves of the regular transcript services

e Educational Testing Service. Students must request the Testing Service to nd copies of test scores to the School of Education.

Students required to take the Examinations must register for them with the ducational Testing Service. Application forms are available in the Office of e Dean.

EACHING-FIELD PREPARATION

eaching-field preparation depends upon the teaching position for which the tudent is preparing. Those planning to teach in elementary schools need a egree of competency in several fields. Those preparing to teach in junior or enior high schools must demonstrate competency in a major teaching field. A inor teaching field is optional, but recommended. The student should begin eaching-field preparation while in the first two years in Columbian College.

Teaching-field requirements, developed in cooperation with appropriate departments of the University, include satisfactory completion of prescribed academic courses in one or more fields, a satisfactory score on the special field examination of the National Teacher Examinations*, and satisfactory completion of the prescribed special methods courses.

Prescribed academic courses vary in number in accordance with the scope nd complexity of the teaching field and the license requirements of the various states. Minimum academic course requirements for each major teaching ield are listed on succeeding pages. Minor teaching-field requirements are omewhat less than those of a major field. Students preparing to teach on the lementary level are advised to use electives to increase their mastery of conent in an academic field or an area of specialization.

Art

	ART HISTORY	Semester Hours
Art 31–32:	Survey of Western Art, or	
Art 71–72:	Introduction to the Arts in America	6
Art:	Two second-group or third-group Art History courses if open to undergraduates	6

	FINE ARTS	
Art:	To be selected from the following	27
†Art 21–22:	Design I: Basic	
Art 23–24:	Fundamentals of Photography	
Art 41–42:	Drawing I	
Art 51–52:	Ceramics I	
Art 57–58:	Graphics I	
Art 65–66:	Painting I	

* Special field examinations of the National Teacher Examinations are available in elementary education; early childhood education; biology and general science; English language and literature; industrial arts; mathematics; chemistry, physics, and general science; social studies; physical education; business education; music education; home economics; and art education.

Students preparing to teach history or geography take the special field examination in social studies.

Students preparing to teach in fields in which special field examinations are not available must obtain a satisfactory score on a special field examination given by the instructor in the special methods course involved.

† Art 21-22 or permission of Department Chairman is prerequisite to all other Fine Arts courses.

Art 81–82:	Sculpture I
Art 123–24:	Design II: Individual Problems
Art 125–26:	Painting II
Art 127–28:	Painting III
Art 131–32:	Ceramics II
Art 137:	Workshop in Materials, Methods, and Techniques
Art 143–44:	Serigraphy
Art 151–52:	Ceramics III
Art 153–54:	Graphics II
Art 157–58:	Graphics III
Art 163–64:	Design: Visual Communication
Art 179–80:	Sculpture II
Art 181–82:	Intermediate Photography
Art 189–90:	Sculpture III
	Total

Biology*

BiSc 11–12:	Introductory Biology for Science Majors
BiSc 101:	Invertebrate Zoology, or
BiSc 104:	Comparative Vertebrate Anatomy
BiSc 108:	Organic Evolution, or
BiSc 127:	Genetics
BiSc 128:	Genetics Laboratory
BiSc 140:	General Ecology
BiSc 163:	Human Physiology
BiSc 164:	Human Physiology Laboratory
BiSc:	Advanced Botany courses as approved by the adviser
Chem 11–12:	General Chemistry
Phys 1:	Foundations of Physics
Phys 2:	Introduction to Modern Physics
	Total

Chemistry

†Chem 11–12:	General Chemistry, or
Chem 15–16:	Intensive General and Analytical Chemistry
†Chem 22:	Introductory Quantitative Analysis
Chem 151–52:	Organic Chemistry
Chem 153–54:	Organic Chemistry Laboratory
Chem 110:	Introduction to Physical Chemistry, or
Chem 111:	Physical Chemistry
Chem 134:	Descriptive Inorganic Chemistry
Chem 191:	History of Chemistry
Math 6:	Plane Trigonometry
Math 30:	Precalculus

* Other courses recommended but not required – Chem 50, or 151-52 and 153-54; Math 31.
† Chem 22 required if Chem 11-12 is elected.

		Semester Hours
Math 31:	Calculus of One Variable	3
Phys 1:	Foundations of Physics	4
Phys 2:	Introduction to Modern Physics	4
	Total	40–44

Earth Science

BiSc 3:	Introductory Biology for Nonscience Majors	3
Chem 11–12:	General Chemistry	8
Geol 111:	Mineralogy	3
Geol 21–22:	Physical and Evolutionary Geology	6
Geol 101:	History of Geological Sciences	3
Geol 151:	Invertebrate Paleontology	3
Geol 125:	Marine Geology	3
*Math 3:	College Algebra	3
*Math 6:	Plane Trigonometry	3
Phys 1:	Foundations of Physics	4
Other Courses:	To be selected from the following as approved by the adviser	6–9
Anth 186:	Physical Anthropology of Modern Man	
Geol 122:	Structural Geology	
Geol 128:	Geomorphology	
Geol 141:	Introductory Geochemistry	
Geol 163:	Sedimentation	
Geol 172:	Regional Geology of North America	
Geol 189:	Geophysics of the Solid Earth	
	Total	45–48

Elementary Education†

Art:	As approved by the adviser	3
Econ 1:	Principles of Economics	3
Geog 51:	Introduction to Geography, or	
Geog 52:	Introduction to Economic Geography	3
Hist 71–72:	Introduction to American History	6
Math 9, 10:	General Mathematics I, II	6
Music:	As approved by the adviser	3
HKLS:	As approved by the adviser	3
‡Science:	As approved by the adviser	9–12
Social Studies:	As approved by the adviser	6
	Total	42–45

*Additional mathematics is required for some advanced geology courses.

†Students majoring in Elementary Education may prepare for an additional area of certification by substituting a special sequence of courses in Early Childhood Education or Special Education for elective courses. Courses in these areas are listed, together with the professional courses in Elementary Education, on pages 121-22.

‡The science requirement must include courses in both physical and biological sciences.

English

Engl 9 or 10:	English Composition: Language as Communication
Engl 11:	English Composition: Language and the Arts and Sciences. or
Engl 12:	English Composition: Language in Literature
Engl 52:	Introduction to English Literature
Engl 71–72:	Introduction to American Literature
Engl 101:	Expository Writing
Engl 115:	Introduction to English Linguistics
Engl 127–28:	Shakespeare
SPDR 11:	Voice and Diction
*Engl:	To be selected from the following as approved by the adviser
Engl 117–18:	English Poetry: Form and Content
Engl 133–34:	The Romantic Movement
Engl 135–36:	Victorian Literature
Engl 137–38:	The 20th Century
Engl 153–54:	The English Novel
Engl 155–56:	The English Drama
Engl 161–62:	Studies in American Literature
Engl 163–64:	Major American Poets
Engl 165–66:	American Drama
Engl 167–68:	The American Novel
Engl 171–72:	Major American Writers
Engl 173–74:	Selected Literary Movements
Engl 175–76:	Special Topics in American Literature
Engl 177–78:	Contemporary American Literature
	Total

French

Fren 9:	Expression orale du français contemporain, and
Fren 10:	Cours de Syntaxe, or
Fren 12:	French Conversation and Composition (Intensive)
Fren 51–52:	Survey of French Literature. or
Fren 91–92:	Analyse de texte
Fren 103:	Diction, phonétique appliquée
Fren 108:	Cours de grammaire avancée
Fren 109:	La Langue pratique
Fren 110:	Cours de stylistique
Fren:	To be selected from the following
Fren 119–20:	French Literature of the Middle Ages and the Renaissance
Fren 121–22:	17th Century French Literature
Fren 123–24:	18th Century French Literature
Fren 125–26:	19th Century French Literature
Fren 127–28:	20th Century French Literature
Fren 193:	Cours de style
Other Courses:	Recommended from the following but not required

* Not required for the minor teaching field

		Semester Hours
Art 109:	19th Century Art in Europe	
Art 110:	Contemporary Art	
Engl 115:	Introduction to English Linguistics	
Foreign Lang:	Other than French as approved	
Hist 141–42:	History of France	
Psyc 115:	Psychology of Language and Communication	
	Total	42–45

General Science*

BiSc 3–4:	Introductory Biology for Nonscience Majors	6
†Chem 11–12:	General Chemistry, or	
Chem 15–16:	Intensive General and Analytical Chemistry	8
†Chem 22:	Introductory Quantitative Analysis	4
Phys 1:	Foundations of Physics and	
Phys 2:	Introduction to Modern Physics, or	
Phys 9–10:	Introduction to Astronomy	6–8
‡Science:	Additional courses as approved by the adviser	10
Math:	To be selected from the following	9
Math 3:	College Algebra	
Math 6:	Plane Trigonometry	
Math 30:	Precalculus	
Math 31:	Calculus of One Variable	
Math 32:	Calculus of Several Variables	
Math 33:	Calculus of Vector Functions	
	Total	41–47

Geography

Geog 51:	Introduction to Geography	3
Geog:	To be selected from the following	21
Geog 125:	Transportation Geography	
Geog 127:	Population and Settlement	
Geog 132:	Resource Management and Conservation	
Geog 135:	Resources and Environmental Quality	
Geog 139:	Geographic Perspectives on Current World Problems	
Geog 140:	Urban Geography	
Geog 141:	Urban Settlement	
Geog 142:	Urban Environments	
Geog 143:	Social Geography	
Geog 144:	Environmental Adaptation	
Geog 145:	Cultural Geography	
Geog 146:	Political Geography	
Geog 161:	Latin America	
Geog 164:	Geography of China	
Geog 198:	Current Geographic Topics	
	Total	24

* May not be chosen as a minor teaching field.
† If Chem 11-12 is elected, it must be followed by Chem 22. If Chem 15-16 is elected, Chem 22 is not required, however, Chem 50 is recommended following Chem 16.
‡ Eighteen semester hours in one science field are required for certification.

German

		Sem. Hr.
Germ 9–10:	German Conversation and Composition	
Germ 51–52:	Introduction to German Literature—in English	
Germ 179–80:	Advanced German Conservation and Composition	
*German:	Additional courses as approved by the adviser	
	Total	

History

Hist 39–40:	European Civilization in Its World Context	
Hist 71–72:	Introduction to American History	
Hist:	Research Seminar (see adviser, Department of History)	
Hist:	Six semester hours in each of three of the following groups as approved by the adviser	
*Hist:	Additional semester hours from any one of the following groups as approved by the adviser	
	Total	

GROUP 1: AMERICAN HISTORY

Hist 167:	Man-made America: the Colonial Scene
Hist 169:	The American Revolution
Hist 170:	U.S. Early National History
Hist 171–72:	U.S. Social History
Hist 173–74:	Afro-American History
Hist 175–76:	U.S. Political History
Hist 177:	The Ante-bellum South
Hist 178:	Recent U.S. History
Hist 179–80:	U.S. Economic History
Hist 181–82:	U.S. Diplomatic History
Hist 185:	Women in America
Hist 186:	U.S. Urban History

GROUP 2: EUROPEAN HISTORY

Hist 108:	The Ancient Near East and Egypt to 322 B.C.
Hist 109:	Early Aegean and Greek Civilizations to 338 B.C.
Hist 110:	The Roman World to 337 A.D.
Hist 111–12:	Medieval History
Hist 113:	Early Middle Ages
Hist 121:	The Renaissance in Western Europe
Hist 122:	The Reformation in Western Europe
Hist 131–32:	History of Germany
Hist 139–40:	World History in the 20th Century
Hist 141–42:	History of France
Hist 143:	Europe East of the Elbe, 1815–1939
Hist 144:	Medieval Russia
Hist 145:	Imperial Russia

* Not required for the minor teaching field.

Hist 146:	Soviet Russia
Hist 147:	Economic History of Europe
Hist 149–50:	European Diplomatic History
Hist 151–52:	History of England
Hist 153:	Tudor England
Hist 154:	Stuart England
Hist 157:	20th Century European Diplomatic History
Hist 158:	Modern Jewish History

GROUP 3: THE EASTERN WORLD

Hist 138:	History of World Communism
Hist 144:	Medieval Russia
Hist 145:	Imperial Russia
Hist 146:	Soviet Russia
Hist 187:	History of Modern China
Hist 188:	History of Chinese Communism
Hist 189:	History of Modern Japan
Hist 193:	History of the Near East
Hist 194:	History of the Modern Near East
Hist 195–96:	History of East Asia

GROUP 4: LATIN AMERICAN HISTORY

Hist 161:	Revolution in 20th Century Latin America: the Mexican and Cuban Experience
Hist 163–64:	History of Latin America
Hist 165:	History of Brazil
Hist 166:	History of Mexico
PSc 177:	Governments and Politics in Latin America
PSc 178:	International Relations of Latin America

Mathematics

		Semester Hours
Math 30:	Precalculus	3
Math 31:	Calculus of One Variable	3
Math 32:	Calculus of Several Variables	3
Math 33:	Calculus of Vector Functions	3
Math 121:	Introduction to Abstract Algebra	3
Math 124:	Introduction to Matrix Theory	3
Math 135:	Projective Geometry	3
*Math:	Three additional second- or third-group courses in Mathematics approved by the adviser	9
Stat 97:	Introduction to Computer Programming	3
Stat 157–58:	Introduction to Mathematical Statistics	6
	Total	39

Music

Mus 5–6:	Harmony	6
Mus 103–4:	History of Music	6

* Not required for the minor teaching field.

Mus 131–32:	Advanced Theory
Applied Music:	Voice or major instrument
Applied Music:	Minor instruments
Ensemble:	Choral or Orchestral
Music Literature or Music Theory:	As approved by the adviser
	Total

Physics

Math 30:	Precalculus
Math 31:	Calculus of One Variable
Math 32:	Calculus of Several Variables
Math 33:	Calculus of Vector Functions
Phys 31–32:	Introduction to Theoretical Physics
Phys 151:	Intermediate Research
Phys 161:	Mechanics I
Phys 163:	Physical and Quantum Optics
Phys 164:	Thermodynamics
Phys 165:	Electromagnetic Theory
Phys 167:	Principles of Quantum Physics
	Total

Russian

Slav 9–10:	Intermediate Russian Conversation and Composition
Slav 91–92:	Introduction to Russian Literature
Slav 141–42:	Russian Romanticism and Realism, or
Slav 151–52:	20th Century Russian Literature
Slav 185:	Russian Linguistic Structure I: Phonology and Morphology
Slav 186:	Russian Linguistic Structure II: Syntax, Lexicon, and Semantics
Slav 197:	Methodology of Teaching Russian
*Slav:	Additional courses from the following as approved by the adviser
Slav 101:	Readings in the Soviet Press
Slav 103:	Scientific Russian
Slav 104:	Business Russian
Slav 109–10:	Advanced Russian Conversation and Composition
Slav 128:	Dostoevsky, the Man and the Artist
Slav 143–44:	The Russian Novel
Slav 146:	The Russian Short Story
Slav 153:	Turgenev
Slav 156:	Leo Tolstoy, His Life and Works
Slav 157:	Nabokov
Slav 158:	Solzhenitsyn
Slav 161–62:	Russian Culture
Slav 165:	Soviet Literature from the Revolution to World War II

* Not required for the minor teaching field.

		Semester Hours
Slav 166:	Soviet Literature from World War II to the Present	
Slav 172:	Soviet Dissent	
Slav 193–94:	The Other Slavs: Their Literature—in English	
	Total	36

Social Studies

Econ 1–2:	Principles of Economics	6
Hist 39–40:	European Civilization in Its World Context	6
Hist 71–72:	Introduction to American History	6
PSc 4 or 5, 6:	Introduction to Political Science	6
Other Courses:	To be selected from the following	6
Anth 1–2:	Introductory Anthropology	
Geog 51:	Introduction to Geography	
Geog 52:	Introduction to Economic Geography	
Soc 1:	Introductory Sociology	
Soc 2:	Uses of Sociology	
*Other Courses:	Second-group courses, as approved by the adviser, from Anthropology, Economics, Geography and Regional Science, History, Political Science, and Sociology	12
	Total	42

Spanish

Span 9–10:	Spanish Conversation and Composition, or	
Span 12:	Spanish Conversation and Composition (Intensive)	6
Span 51–52:	Survey of Spanish Literature and Civilization	6
Span 91–92:	Explicación de textos	6
Span 109–10:	Advanced Spanish Conversation and Composition	6
Span:	Two full-year courses selected from second-group Spanish or Spanish American Literature courses	12
Other Courses:	Recommended from the following	6
Engl 115:	Introduction to English Linguistics	
Foreign Lang:	Other than Spanish as approved	
Hist 161:	Revolution in 20th Century Latin America: the Mexican and Cuban Experience	
Hist 163–64:	History of Latin America	
Hist 165:	History of Brazil	
Hist 166:	History of Mexico	
Psyc 115:	Psychology of Language and Communication	
Span 193:	Curso de estilo	
Span:	Second-group courses in Spanish and Spanish American Literature not previously elected	
	Total	42

Speech and Drama

SPDR 1:	Communicative Speaking and Listening	3
SPDR 11:	Voice and Diction	3

* Not required for the minor teaching field.

SPDR 32:	Oral Interpretation of Literature
SPDR 101:	Bioacoustics
SPDR 103:	Biophonetics
SPDR 112:	Advanced Public Speaking
SPDR 121:	Group Discussion and Conference Leadership
SPDR 169:	Introduction to Creative Dramatics
Area of Specialization:	Selected from one of the following groups as approved by the adviser
	Total

GROUP 1: SPEECH COMMUNICATION*

SPDR 126:	Argumentation and Debate
SPDR 127–28:	Advanced Debate Practice
SPDR 133:	Broadcasting in America
SPDR 134:	Radio Production and Performance
SPDR 143:	Origins of Contemporary Rhetorical Theory
SPDR 144:	History and Criticism of American Public Address

GROUP 2: DRAMA*

SPDR 115–16:	Acting
SPDR 151–52:	Stagecraft
SPDR 154:	Directing
SPDR 155–56:	Play Production Practice
SPDR 165–66:	History of the Theatre

PROFESSIONAL EDUCATION

The basic professional information, skills, and attitudes needed by beginning teachers are provided through a sequence of courses to be taken in the junior and senior years. Lectures and class discussions are closely coordinated with field work. Instruction is differentiated to meet the needs of those preparing to teach on the various levels—elementary school, junior high school, senior high school, and adult.

The prescribed courses in special methods are concerned primarily with methods of initiating, guiding, and evaluating learning experiences dealing with the content of teaching fields. They attempt to bring to the student specific suggestions drawn from the accumulated experience of successful teachers. However, in addition, the courses review the teaching-field content currently in use in schools, and examinations at the end of courses provide the final test of competency in the teaching fields.

Professional Courses—Secondary†

Educ 108:	Human Development, Learning, and Teaching
Educ 112:	Educational Measurement

* Not required for the minor teaching field.
† A course in the teaching of reading is recommended since it is required for employment in many jurisdictions.

		Semester Hours
Educ 123:	Society and the School	3
Educ 131:	Secondary School Principles and Methods	3
Educ 134:	Student Teaching in Secondary Schools	6–9
ecial Methods:	Three to six semester hours from the following courses	3–6
Educ 136:	Teaching English in Secondary Schools	
Educ 137:	Teaching Speech	
Educ 138:	Teaching Social Studies in Secondary Schools	
Educ 139:	Teaching Art in Secondary Schools	
Educ 140:	Teaching Mathematics in Secondary Schools	
Educ 142:	Teaching Music in Secondary Schools	
Educ 144:	Teaching Science in Secondary Schools	
Educ 146:	Teaching Foreign Languages	
	Total	21–27

Professional Courses—Elementary

Educ 108:	Human Development, Learning, and Teaching	3
Educ 111:	Elementary School Curriculum and Methods	15
Educ 112:	Educational Measurement	3
Educ 115:	Elementary School Teaching of Reading	3
Educ 123:	Society and the School	3
Educ 135:	Student Teaching in Elementary Schools	9
	Total	36

Students majoring in Elementary Education may prepare for an additional ea of certification by substituting a special sequence of courses in Early hildhood Education or Special Education for elective courses.

AREA OF CERTIFICATION IN EARLY CHILDHOOD EDUCATION*

Educ 132:	Student Teaching in Early Childhood Schools	6
Educ 150:	Foundations of Early Childhood Education	3
Educ 152:	Early Childhood Curriculum	3
Educ 153:	Role of the Professional in Early Childhood Education	3
Educ 154:	Community Resources and Materials for the Young Child	3
	Total	18

AREA OF CERTIFICATION IN SPECIAL EDUCATION†

SpEd 101:	Seminar: Dimensions of the Complementary Teaching Role	3
SpEd 102:	Teaching the Child with Special Needs: Methods and Materials	3
SpEd 103:	Teaching the Child with Special Needs: Creative Programming	3
SpEd 170:	Interpersonal/Intrapersonal Relationships for Special Education Teachers	3

* Students planning to seek certification in Early Childhood Education must check with the adviser during the sophomore year.
† SpEd 102, 103, 170, 189, and 190 must be taken prior to the senior year.

SpEd 189:	Preprofessional Internship: Observing the Special Child in the Regular Class Milieu
SpEd 190:	Preprofessional Internship: Inspecting a Continuum of Special Education Services
SpEd 199:	Internship in Complementary Teaching
	Total

BACHELOR OF SCIENCE IN HUMAN KINETICS AND LEISURE STUDIES

The curriculum, which is designed to prepare students for teaching in elementary and secondary school programs of physical education, offers opportunities for specialization in dance, elementary or secondary school physical education.

The student wishing to prepare to teach another subject in addition to physical education may use his elective hours to work toward a minor teaching field. Relevant work in Columbian College may be counted.

PREREQUISITE

For the first two years of the Bachelor of Science in Human Kinetics and Leisure Studies curriculum, see Columbian College of Arts and Sciences, pages 80–81.

CURRICULUM

Specialization in Dance

Junior and Senior Years

Educ 108:	Human Development, Learning, and Teaching
Educ 112:	Educational Measurement
Educ 123:	Society and the School
Educ 134:	Student Teaching in Secondary Schools
HKLS 109–10:	Dance Composition
HKLS 117:	Dance Education
HKLS 135–36:	Dance History
HKLS 141–42:	Theater Production for the Dance
HKLS 150:	Human Anatomy
HKLS 151:	Kinesiology
HKLS 164:	Physiology of Exercise
HKLS:	Nine semester hours to be selected from the following
HKLS 119:	Creative Dance for Children
HKLS 120:	Repertory
HKLS 129:	Introduction to Motor Learning
HKLS 137:	Dance Notation and Movement Analyses: the Laban System
HKLS 144:	Choreography
Elective:	
	Total

ecialization in Elementary School Human Kinetics and Leisure Studies

Junior Year

		Semester Hours
Educ 108:	Human Development, Learning, and Teaching	3
Educ 123:	Society and the School	3
HKLS 101:	Physical Education in the Elementary School	3
HKLS 102:	Movement Education	3
HKLS 113:	Field Experience: Practicum in Physical Education, Dance, or Recreation (Prerequisite for HKLS 133)	3
HKLS 130:	Motor Performance in Childhood	3
HKLS 138:	Physical Education Curriculum and Administration	3
HKLS 150:	Human Anatomy	3
HKLS 151:	Kinesiology	3
Elective:		6
	Total	33

Senior Year

Educ 112:	Educational Measurement	3
HKLS 114:	Field Experience: Practicum in Physical Education, Dance, or Recreation (Prerequisite for HKLS 133)	3
HKLS 129:	Introduction to Motor Learning	3
HKLS 133:	Student Teaching	6–12
HKLS 164:	Physiology of Exercise	3
Elective:		6
	Total	24–30

Specialization in Secondary School Human Kinetics and Leisure Studies

Junior Year

Educ 108:	Human Development, Learning, and Teaching	3
Educ 123:	Society and the School	3
HKLS 111–12:	Sports Education Technique	6
HKLS 113:	Field Experience: Practicum in Physical Education, Dance, or Recreation (Prerequisite for HKLS 133)	3
HKLS 138:	Physical Education Curriculum and Administration	3
HKLS 150:	Human Anatomy	3
HKLS 151:	Kinesiology	3
Elective:		9
	Total	33

Senior Year

Educ 112:	Educational Measurement	3
HKLS 114:	Field Experience: Practicum in Physical Education, Dance, or Recreation (Prerequisite for HKLS 133)	3
HKLS 129:	Introduction to Motor Learning	3

HKLS 133: Student Teaching
HKLS 164: Physiology of Exercise
Elective:

Total .....

Graduate Study

THE SCHOOL OF EDUCATION OFFERS GRADUATE PROGRAMS leading to the de of Master of Arts in Teaching, Master of Arts in Education, Education Spe ist, and Doctor of Education.

GRADES

For graduate work, grades are indicated as *A*, Excellent; *B*, Good; *C*, Minim Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; *CR*, Credit. Grade *B*, *C*, and *F* are counted in computing the quality-point index (see page

Whenever a grade has not been assigned, the symbol *I* (Incomplete) or symbol *W* (Authorized Withdrawal) will be recorded. The symbol *I* indic that a satisfactory explanation has been given to the instructor for the stude failure to complete the required work of the course. An "Incomplete" can be made up after the lapse of one calendar year except by written permissio the Dean's Council. An "Incomplete" which is not removed within one cale year is automatically changed to an *F*. An "Incomplete" cannot be removed reregistering for the course.

THE DEGREE OF MASTER OF ARTS IN TEACHING

The School of Education offers an intensive, interdisciplinary fifth year museum education. This program is designed to prepare selected liberal a graduates, postgraduates, and professionals for education work in a muse or for liason work between museum and school systems. Students receive degree of Master of Arts in Teaching upon completion of the program.

For details write the Chairman of the Department of Education, M.A Program, School of Education, George Washington University, Washingto D.C. 20052.

ADMISSION TO THE PROGRAMS

To be admitted to the program in museum education an applicant must (1 have a Bachelor's degree from an accredited institution; (2) submit thr written references attesting to quality of academic record and work experienc and (3) be interviewed by the University Selection Committee or make alte native arrangements specified by the Committee and approved by the Dea of the School of Education. Considered essential are skills in communicatio a desire to study and learn from the artifacts of nature and civilization, a

ability for and interest in working with people. Evidence of strong undergduate, graduate, or professional experience in such fields as American history, geology, art, or the social sciences will be considered favorably.

AN OF STUDY FOR THE MUSEUM EDUCATION PROGRAM

e program begins with a six-week summer session. Emphasis in the urse work will be on the study of museums and the understanding of groups rved. During the fall semester students will study the school as an institution its organization, pupil population, staff, services—and as a laboratory where ey will work in classrooms with students and teachers. Emphasis will also cus on communication skills and interpersonal relations through a study of chniques for successful communication, barriers to communication, language e and the search for meaning. Students will also earn at least 12 semester urs of credit throughout the year in a special field, e.g., anthropology, American civilization, fine arts, zoology, or any content appropriate to education a museum.

During the spring semester students will have an internship field work experience in area science, art, and history museums. They will also have an n-campus seminar covering museum education issues such as (1) the museum sit—programs for groups and individuals; (2) new communication techiques and media; (3) exhibitions—practical consideration of exhibition degn based on education research, and practical consideration of installation nd traveling exhibition procedures; and (4) evaluation and research—identifyng research problems for museum education, such as how to measure audience eaction.

HE DEGREE OF MASTER OF ARTS IN EDUCATION

Programs of study leading to the degree of Master of Arts in Education are lesigned to enable prospective teachers and teachers of experience to increase heir knowledge of professional and academic information and skills and preare for special types of educational service. They also provide opportunities for college graduates in other disciplines to acquire needed professional education, as well as study in the subjects which they are planning to teach.

From the various related departments of the University, the student and his adviser select courses to give the student an adequate background in his chosen field of service. Programs for teachers-in-service and experienced teachers planning to re-enter the profession are differentiated from those for students without teaching experience.

Master's programs are available in the following fields:

Adult Education
College Student Development
Curriculum
Early Childhood Education
Elementary Administration
Elementary Education
Guidance and Counseling
Generic Counseling
Higher Education
Human Resource Development
Human Kinetics and Leisure Studies
(candidates may specialize in adaptive physical education, dance, elementary or secondary school physical education, therapeutic recreation, tourism development, or urban recreation and parks)

Reading
Rehabilitation Counseling
Secondary Administration
Secondary Education
Special Education (candidates may specialize in crisis-resource teaching, diagnostic-prescriptive teaching, or early childhood special education)
Supervision and Human Relations

For teachers interested in developing or strengthening their academic competence, the elementary and secondary education fields normally permit to 18 semester hours of work in departments other than education. These programs are designed to meet the needs of teachers-in-service who need additional work in content to qualify for advanced certification or to improve classroom skills; and may also be helpful to previously trained teachers planning to re-enter the profession. The major emphasis is upon strengthening the academic and professional competencies of the teacher.

Additional information concerning these programs may be obtained writing or telephoning the Office of the Dean.

ENTRANCE REQUIREMENTS

A Bachelor's degree from an accredited institution, an undergraduate quality point index of 2.50 or above (*C* + average), demonstrated interest in teaching, and personality traits that give promise of success as a teacher, are required. In a number of programs there are more applicants than can be accepted; therefore, selections by additional criteria are necessary.

Two years of successful teaching are required before admission to candidacy in the field of school administration. Experience is required for admission to programs in adult education and human resource development.

ADMISSION TO CANDIDACY

Candidates whose undergraduate preparation does not include equivalents of the basic requirements for the degree of Bachelor of Arts in Education may make up deficiencies and may be required to take designated tests.

ADVANCED STANDING

For the record, advanced standing is granted for approved courses taken at other accredited institutions, but a minimum of 30 semester hours must be completed at this University as a Master's candidate.

A maximum of 12 semester hours of advanced courses completed in the University in excess of the requirements for the Bachelor's degree may be credited toward the Master's degree if the work fits in with the student's plan of specialization.

Advanced standing is not granted for work completed five or more years before application for admission or readmission to Master's candidacy.

REQUIREMENTS FOR THE DEGREE

PLAN OF STUDY

The plan of study leading to the degree of Master of Arts in Education requires a minimum of 33 hours of graduate credit. The plan may, at the student's

n, include a thesis carrying 6 hours of graduate credit. Whether or not a stu-
nt selects the thesis option, a minimum of 18 hours must be from courses
nned primarily for graduate students (third-group courses). The 18 hours
ust include a course in research methods and procedures. A minimum of 12
urs, not including the thesis or the research course, must be from courses
ered by the School of Education.

Programs may include additional teaching-field preparation. In such cases,
owever, undergraduate and graduate courses combined must be at least equiva-
nt to the undergraduate requirements for the degree of Bachelor of Arts in
ducation (see pages 110–122).

Programs are planned initially in conference with an admission adviser in the
ffice of the School of Education and subsequently with a designated adviser
the candidate's area of specialization. These programs are based on the
terests of the candidate, his previous background, and the certification re-
uirements of the state and locality in which the candidate plans to teach.

All degree requirements must be completed within a period of six years.

ESIDENCE

A candidate for the Master's degree is required to complete satisfactorily 30
emester hours in residence in the School. With the approval of the adviser, 9
f the 30 hours may be off-campus courses in the College of General Studies.

CHOLARSHIP

A quality-point index of 3.00 is required for graduation. Students who re-
eive the grade of *C* in more than 6 semester hours are subject to suspension.
Students who receive a grade of *F* must confer with the Dean of the School of
Education before enrollment for further work.

THE THESIS

The choice of the thesis subject must be approved in writing by the student's ad-
viser and filed in the Office of the Dean. A statement of the School of Educa-
tion standards for the thesis and printed copies of detailed regulations regarding
the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the period of
registration, to the advice and direction of the member of the faculty under
whom the thesis is to be written. In case a thesis is unfinished, an additional
calendar year may be granted without further tuition payment. The student
must, however, maintain continuous registration (see page 49) during this
period. If the preparation of the thesis extends beyond the additional calendar
year, the student must register for the entire 6 hours of thesis again and pay
tuition as for a repeated course.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to the course examinations, the candidate must pass a special three-
hour examination on his area of specialization. Candidates for the examination
must be registered for the semester it is to be taken, and must file a written ap-
plication in the Office of the School of Education no later than thirty days
prior to the date of the examination.

THE DEGREE OF EDUCATION SPECIALIST

The School of Education provides a program of advanced study leadin the degree of Education Specialist for students with Master's degrees in Ed tion who seek further professional preparation for specific objectives.

Education Specialist programs are available in the following fields:

Administration
Adult Education
Curriculum
Counselor Education
Elementary Administration
Higher Education
Secondary Administration

ENTRANCE REQUIREMENTS

The degree of Master of Arts in Education from this University (or the equ lent), a satisfactory score on the Miller Analogies Test or the Graduate Re Examination, and two years of successful pertinent experience, are requi

ADMISSION TO CANDIDACY

Each applicant must be interviewed and recommended by a staff member o School of Education or by a representative in the candidate's locality appoi by the Dean.

SCHOLARSHIP

Scholarship requirements for the degree of Education Specialist are the sam those for the degree of Master of Arts in Education (see page 127).

PROGRAMS OF STUDY AND DEGREE REQUIREMENTS

Individual programs are developed, through the faculty-adviser plan, to fit candidates' abilities, interests, needs, and career goals. A minimum of semester hours beyond the requirements of the degree of Master of Arts Education at this University is required. At least 21 hours of this work must taken on campus at this University; with the approval of the adviser, the maining semester hours of the program may be taken in off-campus offeri of the College of General Studies or at another approved university. A ma mum of five calendar years is allowed for completion of the program.

At least 12 of the required 30 hours must be in appropriate graduate cours in Education selected from the following areas: (1) foundations and cogn study, (2) background and general principles of the field of study, (3) an a of specialization.

THE COMPREHENSIVE EXAMINATION

Successful completion of a six-hour written examination and/or an o examination, at the option of the major field adviser, is required.

THE DEGREE OF DOCTOR OF EDUCATIO

The School of Education offers programs of advanced study leading to t degree of Doctor of Education. These programs, which are under the supe

on of the Advanced Graduate Faculty, provide major fields of study in her education, special education, counselor education, administration and riculum, adult education, human resource development, and higher educa- . Supporting fields are available in administration, administration of higher cation, adult education, college student development, counselor education, riculum, elementary education, higher education, human growth and devel- nent, human resource development, reading, secondary education, special cation, supervision, and teacher education. With the approval of the Ad- ced Graduate Faculty and the departments concerned, one supporting field y be taken in other departments of the University. All programs require dy of interrelated areas of education and a doctoral dissertation in the major d of study.

MISSION

e applicant must have adequate preparation for advanced study, including aduate work in fields prerequisite to his objective equivalent to that required the degree of Master of Arts in Education at this University, at least three ars of successful pertinent educational experience, acceptable personal quali- s, and a capacity for creative scholarship and effective leadership.

The applicant first arranges for an interview with the Assistant Dean for ad- nced graduate studies to explore his needs in relation to the resources of the hool and to guide him in his application for doctoral study. The required mission procedures and standards will be explained at this time. Candidates eeting the initial standards are admitted to precandidacy for the degree.

RECANDIDACY

the precandidacy period a minimum of 9 semester hours of course work the program, including requirements specified by the Advanced Graduate aculty, must be completed. This work must be completed within three se- esters of admission to precandidacy, for part-time students, or within the rst 18 semester hours of course work for full-time students. Application for ll candidacy will then be decided on the basis of the quality of scholarship the precandidacy period, the recommendations of instructors, a detailed lan for the balance of the program, and a qualifying examination.

LAN OF STUDY

n general, from two to three years of full-time study beyond the degree of Master of Arts in Education, or the equivalent in part-time study, are required. rograms are individually planned. It is estimated that, for the average student, he work required for the total program will be 75 semester hours, including minimum of 12 semester hours of dissertation research.

Each program is divided into two parts. The first consists of preparation for comprehensive examinations in a major field of study and two supporting ields, and completion of a required research tool field. The second is com- posed of research investigation, the writing of a dissertation, and the final oral examination.

Students who have completed the comprehensive examinations and who were not registered for doctoral study under the payment plan in effect prior to July

1, 1967, must register for a minimum of 6 semester hours of Dissertatio search (491) a semester until 12 hours have been completed, and a min of 3 semester hours a semester thereafter until the satisfactory complet the final examination.

COMPREHENSIVE EXAMINATIONS

When the student is admitted to doctoral candidacy, he is assigned to a mittee, each member of which is responsible for guiding him in his prepar for one of the required comprehensive examinations in supporting fields major field comprehensive examination. The candidate must arrange vidual conferences with the committee members to determine the conte each field and to receive guidance in his preparation for the examination.

The supporting field examinations, which are taken first, are three-hour ten examinations. In addition to the research tool field a student who a historical research investigation for his dissertation must complete a propriate research seminar offered by the Department of History. The dent's Dissertation Committee may recommend other tool requirements tool requirement must be completed prior to the major field examination. major field examination is a written 12-hour examination, six hours on of two successive days.

The candidate begins the second part of his program after the satisfa completion of all supporting field examinations, the required research tool and the major field examination.

THE DISSERTATION

A dissertation is required as evidence of ability to perform scholarly res and to interpret and present its results.

During the first part of the program, the Dean appoints a Dissertation mittee, consisting of a major adviser as Director, usually the major field ad and two additional faculty members who serve as readers. The candidate quired to submit a proposal for his dissertation to this Committee, which de mines its acceptability and recommends approval to the Committee on vanced Graduate Studies. The dissertation is completed under the guid of the Director, with the advice of the other members of the Dissertat Committee.

No later than the date specified in the calendar, the candidate must subm the Dean three complete copies of the dissertation and two copies of abstract for inclusion in the announcement of the examination and for re duction by University Microfilms, Inc. Printed copies of detailed regulat regarding the form and reproduction of the dissertation, preparation of abstract, and services offered by University Microfilms, Inc., are available in Office of the Dean. The successful candidate for the doctorate is requ before receiving his degree, to pay a fee to cover the expense of printing Announcement of the Final Examination, and for the basic service rendere by University Microfilms, Inc., and to sign a microfilm agreement.

THE FINAL EXAMINATION

When the dissertation has approval of the Director, he recommends the can date to the Dean for the final oral examination, which must be passed at le

e weeks before the degree is to be conferred. The examination is open to public and is conducted by a committee of the Faculty, appointed by the n, supplemented by at least two leaders in the candidate's field of study n outside the University. Candidates who successfully pass the oral exami- on are recommended for the degree by the Faculty of the School of Educa- .

SIDENCE AND CONTINUOUS STUDY

the preparation for the degree, including examinations, courses, seminars, l other work done under the direction of an adviser, must be done in resi- ce. The student must remain registered in the School of Education, except en the Dean or the Advanced Graduate Faculty has granted a leave of ence. Failure to register each semester of the academic year may result in se of candidacy. Subsequent readmission is subject to whatever new condi- ns and regulations have been established by the Advanced Graduate Faculty. The supporting and major field examinations must be completed within five ars of the date of admission, and the entire program must be completed thin eight years, regardless of full-time or part-time study. All candidates ust satisfy one of three options for full-time study. Information concerning ese plans will be provided by the Assistant Dean for advanced graduate studies on request by the candidate.

pecial Programs and Services

DUCATION OF TEACHERS OF EXCEPTIONAL CHILDREN

HE SCHOOL OF EDUCATION offers a program for the education of teachers of xceptional children. Laboratory experiences are arranged in schools for handi- apped children in the metropolitan area. Students are accepted at the junior- r senior-year undergraduate, Master's, Education Specialist, and Doctoral evels. By special permission, teachers, school administrators, and adequately repared students from other schools and colleges of the University may elect hese courses.

Inquiries concerning the program and the availability of scholarships and ellowships should be directed to Dr. Perry Botwin, Department of Special ducation, George Washington University, Washington, D.C. 20052.

RADUATE PROGRAM IN REHABILITATION COUNSELING

The School of Education offers a federally funded Master's degree program for the preparation of rehabilitation counselors. These professional personnel assist persons who are disabled or disadvantaged to assume a proper place in society. The two-year program combines fieldwork with course work in pre- paring students for immediate employment in an expanding field that yields high humanitarian and financial rewards. Both the profession and the program are interdisciplinary, drawing upon such related areas as guidance, medicine, psychology, social work, sociology, and special education.

Traineeships, including tuition and stipends, are available for full-time dents. Information and applications are available from Dr. Daniel S Rehabilitation Counselor Education, Department of Education, George W ington University, Washington, D.C. 20052.

GRADUATE SPECIALIZATION IN THERAPEUTIC RECREATION AND ADAPTIVE PHYSICAL EDUCATION

The School of Education offers a federally funded Master's degree progra the field of physical education with a specialization in therapeutic recreati adaptive physical education. This program is funded by the Bureau of Ed tion for the Handicapped, U.S. Office of Education. Both programs re an intensive internship (minimum of 510 clock hours) in University affil training centers in Washington area hospitals, schools, clinics, and p agencies. Inquiries concerning this program and the availability of grad research assistantships and internships should be directed to Dr. Donal Hawkins, Department of Human Kinetics and Leisure Studies, George W ington University, Washington, D.C. 20052.

CERTIFICATION CURRICULA

The School of Education provides individually planned programs for liberal graduates with appropriate degrees who wish to prepare for teaching. T seeking certification, but not wishing to work for a degree, may enroll certification program if they meet the admission, scholarship, and persona requirements of degree candidates. The School also provides a wide range courses of interest to teachers who wish to renew licenses.

READING CENTER

(See pages 53–54)

OFF-CAMPUS DEGREE PROGRAMS

The School of Education has academic jurisdiction over the off-campus p grams leading to the degree of Master of Arts in Education in the fields elementary administration; elementary education; higher education; huma resource development; secondary administration; secondary education; spec education—crisis-resource teaching, diagnostic-prescriptive teaching, ea childhood special education; and supervision and human relations.

These degree programs are administered by the College of General Studi For details concerning the off-campus programs see the *College of Gen Studies* Catalogue.

CHOOL OF GOVERNMENT AND BUSINESS DMINISTRATION

an Peter B. Vaill
ociate Deans S.F. Divita, H.R. Page
istant Dean John Lobuts, Jr.

ACULTY*

ofessors Frederick Amling, Guy Black, H.F. Bright, D.S. Brown, J.C. Dockeray (*Emeritus*), R.B. Eastin, R.F. Ericson, Leon Gintzig, P.D. Grub, P.M. Horvitz (*Visiting*), J.L. Jessup, G.P. Lauter, E.J.B. Lewis, G.L. Lippitt, A.J. Mastro, D.C. McGrath, Jr., H.R. Page, D.D. Roman, R.C. Sedwick, Edwin Timbers, P.B. Vaill, R.H. Walther (*Research*), M.M. Wofsey

ssociate Professors Elizabeth Adams, R.A. Barrett, R.R. Bonato (*Research*), J.H.H. Carrington, S.R. Chitwood, K.J. Darr, M.C. Devolites, S.F. Divita, Rodney Eldridge, S.S. Fuller, M.G. Gallagher, Sherwin Greene, J.J. Hampton, W.W. Hardgrave, M.M. Harmon, Jerry Harvey, R.L. Holland, F.C. Kurtz, Norma Loeser, E.R. Magruder, J.F. McCarthy, Jr., C.R. Miller, G.E. Morris, Chei-Min Paik, P.N. Reeves, T.E. Shaughnessy, S.N. Sherman, W.E. Smith, E.K. Winslow

djunct Associate Professors P.S. Birnbaum, A.J. Schwab

ssistant Professors B.L. Catron, Elizabeth Cox, J.P. Coyne, Irwin Dubinsky, R.F. Dyer, W.H. Guy (*Research*), John Lobuts, Jr., D.B. Rasmussen, R.G. Shouldice, J.W. Waldrip, K.C. Yang (*Research*)

djunct Assistant Professors M.J. Ackerman, W.J. Auton, J.D. Bentley, W.J. Green, Jr., W.J. Landen, R.L. White

nstructors D.F. Bergwall, Patricia Cleary (*Research*), C.P. McKelvey, Richard Switalski (*Research*)

djunct Instructors F.W. Carter, G.R. DeLisle, S.T. Fisher, C.H. Hayes, R.B. Hinds, N.G. Oglesby

COMMITTEES†

DEAN'S COUNCIL

B.L. Catron, M.C. Devolites, R.F. Dyer, S.S. Fuller, Chei-Min Paik, D.D. Roman, Peter B. Vaill

COMMITTEE ON CURRICULUM

H.R. Page (*Chairman*), Frederick Amling, M.M. Harmon, H.C. Demoody, D.C. McGrath, F.C. Kurtz, K.J. Darr

* The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the University Librarian are ex officio members of the Faculty of the School of Government and Business Administration.
† The Dean of the School is an ex officio member of all committees.

COMMITTEE ON DOCTORAL STUDIES IN BUSINESS ADMINISTRATION AND PUBLIC ADMINISTRATION

G.P. Lauter (*Chairman*), D.S. Brown, H.R. Page, S.S. Fuller, Leon Gi
Jerry Harvey, A.J. Mastro

FELLOWSHIPS

The School of Government and Business Administration has several gra
and doctoral fellowships available to its students, including the Arya
Research Fellowships in International Business, Health Care Administr
Fellowships, Ernst and Ernst Grant to Doctoral Candidates in Busines
Economics, the National Association of Purchasing Management Fello
and the Scottish Rite Fellowships.

INTRODUCTION

This School was organized as the School of Government in 1928. Durin
next two decades, programs in business administration and public admin
tion were added, and the emphasis gradually shifted from undergradua
graduate study. The name was changed in 1960 to the School of Govern
Business, and International Affairs to reflect more accurately the offerin
the School. A division of the School was effected in 1966, and two sch
were established—the School of Government and Business Administratio
primarily professionally-oriented school; and the School of Public and Int
tional Affairs, a primarily policy-oriented school.

OBJECTIVES

The principal objective of the School of Government and Business Admini
tion is to prepare its graduates for positions in the management of comple
ganizations in both business and government. The degree programs are
signed to prepare students both for *entrance* into business and government
for *advancement* to high-level management positions.

Programs in the School include examination of administrative principles
quantitative approaches to decision-making common to both business and g
ernment. These programs stress the points at which major policy decisions
either business or government must give consideration to related policy de
sions of the other. Emphasis is placed on the fact that management educat
is not limited to organizational techniques but is, in the broadest sense, edu
tion for management responsibility.

It is the policy of the School to emphasize a broad fundamental educa
as the best preparation for positions carrying management or administra
responsibility.

Undergraduate programs concentrate the first two years in a broad liberal
curriculum drawn from the social sciences, humanities, quantitative metho
and a limited number of courses in administration. Students in the junior
senior years expand their work to include (1) the functions of business ent
prise, (2) the economic and legal environment of business, (3) the implicatio
of modern analytical techniques based on quantitative methods, (4) the stu
of organization theory and human relations, and (5) the practice of proble
solving techniques.

Graduate programs develop the elements common to all management posi-
ns regardless of the nature of the operation. Master's degree programs are
sed on study of the principles of management, human relations, and prob-
n-solving plus an area of specialization.

Responsive to the needs of the Washington community, the School has fol-
wed the policy of making many of its educational activities available in off-
mpus centers in and around the metropolitan area of Washington. The off-
mpus work leads to a degree carrying a different designation: thus, the Bache-
r of Business Administration degree on campus has a substantial equivalence
the Bachelor of Science in Administration degree offered off campus in facili-
es furnished by government or business organizations. The School is offering
Bachelor of Science in Health Care Administration degree, at this time
mited to students at the Naval School of Hospital Administration, Bethesda,
Md. The Master of Arts in Health Care Administration, Master of Business
dministration, Master of Public Administration, Master of Urban and Reg-
onal Planning, and Master of Arts in Government degrees are offered on
ampus, while the Master of Science in Administration degree is the only
raduate degree offered off campus. The off-campus programs have strong
upport in the area and provide significant contact with the business and gov-
rnment communities. Programs of study leading to the degrees of Bachelor
f Science in Administration and Master of Science in Administration are
isted in the *College of General Studies* Catalogue.

COMMON BODY OF KNOWLEDGE

Programs leading to the degrees of Bachelor of Business Administration, Bache-
lor of Science in Administration, Master of Business Administration, and Master
of Science in Administration include the equivalent of at least one year of work
in the following areas:

1. In the case of business enterprise, a background of the concepts, processes, and institutions in marketing and distribution, production, and financing functions; in the case of governmental administration, a background of concepts, processes, and institutions of planning, programming, budgeting, personnel practices, and policy formulation in government.
2. A background of the economic and legal environment of business and government enterprise, along with consideration of the social and political influences on business.
3. A basic understanding of the concepts and methods of accounting, quantitative methods, and information systems.
4. A study of organization theory, interpersonal relationships, control and motivation systems, and communications.
5. A study of administrative processes under conditions of uncertainty, including the integration of analysis and policy determination at the over-all management level.

ACADEMIC STATUS

The School of Government and Business Administration has maintained full membership in the Middle Atlantic Association of Colleges of Business Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American

Assembly of Collegiate Schools of Business. The programs in Public Acco ing designed to prepare students for Certified Public Accountants examina have been approved by the state boards of New York and Maryland. The gram in Hospital Administration is accredited by the National Accred Commission on Education for Health Services Administration.

REGULATIONS

Regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *stated on pages 21–34; other University regulations, on pages 44–52.*

ATTENDANCE

A student may not attend classes until registration is completed and fees are paid. A student may be dropped from any course for undue absence.

The student is held responsible for all the work of the courses in which he registered, and all absences must be excused by the instructor in charge bef provision is made for him to make up the work missed.

A student suspended for any cause may not attend classes during the peri of suspension.

WITHDRAWAL

Withdrawal from a course or from the University without academic penalty permitted during the first four weeks after registration for the fall or spr semester. Withdrawal after this period is permitted only in unusual circu stances, and requires certification by the instructors of courses for which student is registered that he is doing passing work (see "Withdrawal," pag 47–48).

ADDING COURSES

Courses may not be added after the first full week of classes in any semester summer session.

INDEPENDENT STUDY PLAN

A student of *demonstrated capacity*, with a special interest in the subject matte of a course, may be permitted to undertake study under the personal direct of an instructor, in accordance with the rules of the appropriate departme Credit under this plan is limited to the specific course credits normally allow when taken on a class basis.

The Bachelor of Business Administration Degree

THE SCHOOL OFFERS PROGRAMS leading to the degree of Bachelor of Busines Administration in the fields of Accounting and Business Administration.

ENTRANCE REQUIREMENTS

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least 15 units* which must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and two years of college preparatory mathematics.
2. The principal's statement that the applicant is prepared to undertake college work.
3. College Entrance Examination Board scores submitted on the Scholastic Aptitude Test and the English Composition Achievement Test.

It is recommended that the examinations be taken in December or January. Scores on tests taken in the junior year may be submitted. Arrangements for tests are the responsibility of the applicant and should be made with the Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540; or 1947 Center Street, Berkeley, Calif. 94704, not less than one month before the date of the test. In applying for the test, the applicant should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20052.

The College Entrance Examination Board tests are preferred; however, the American College Testing battery scores will be accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, Iowa City, Iowa. It is recommended that the applicant take the tests in October of the senior year.

The School of Government and Business Administration will consider the adequacy of the qualifications of an applicant who, because of unusual circumstances, does not present all of the formal requirements stated above. The School may prescribe appropriate scholastic-aptitude tests of the University.

Students transferring from other colleges and universities as juniors must offer an acceptable broad-based liberal arts program or equivalent. However, in no case will more than 60 semester hours of advanced standing be granted for course work completed at community or junior colleges. Accounting and Business Administration courses taken at such colleges may be applied toward the Bachelor of Business Administration degree provided they are comparable to this School's courses numbered *under* 100. Courses comparable to BAd 161, Mgt 118, 119, or Stat 97 may also be applied. Other courses (one course per area up to a maximum of three courses), comparable to this School's courses numbered 101-200, taken at an accredited community or junior college where a grade of *C* or better has been earned may be accepted to waive certain required courses; however, the waiver of a required course does not entitle the student to any semester hours of credit toward the total 60 semester hours required for the junior and senior years.

* A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

REQUIREMENTS FOR THE DEG

ACADEMIC WORK LOAD

A full-time student not on probation may not ordinarily take more than semester hours. A student employed more than 24 hours a week, who is on probation, may not take more than 9 semester hours.

A full-time student whose quality-point index is 3.50 or higher may take to 18 semester hours. A student employed more than 24 hours a week, wh index is 3.50 or higher, may take up to 12 semester hours.

A student who accepts employment after registration or at any time duri semester must report immediately to the Dean, so that his program may adjusted if necessary.

Exception to these rules will require the approval of the Dean.

An undergraduate student on probation may take no more than 12 seme hours of course work.

SCHOLARSHIP

To graduate, a student must have the following: (1) a general quality-p index of at least 2.00 and (2) a quality-point index in the major of at le 2.00. All courses in the Bachelor of Business Administration degree major option are to be included in the quality-point index calculation. Elect courses in or out of the School of Government and Business Administrat cannot be used as substitutes in the major quality-point index calculation.

DEAN'S HONOR LIST

The names of students who achieve a quality-point index of 3.50 or higher placed on the Dean's Honor List for that semester. Appearance on the list w be limited to (1) full-time students registered for a minimum of 12 semes hours and (2) part-time students registered for a minimum of 12 semester ho over a period of two consecutive semesters, which may include a summer ter

INCOMPLETE/AUTHORIZED WITHDRAWAL

Conditions under which the grades of *I* (Incomplete) or *W* (Authorized Wi drawal) may be assigned are described on page 46.

Removing an Incomplete.—The grade of *I* must be removed no later th the last day of the examination period for the fall or spring semester immed ately following the semester or summer session in which the grade of *I* is a signed. An "Incomplete" that is not removed within this period is automatical changed to an *F*. In cases of well-documented extenuating circumstances, t instructor and a student may jointly petition the Dean, or the appropriate co mittee, for additional time in which to complete the work of the course. Su petitions should be submitted within the same period. The grade of *I* cann be removed by reregistering for the course here, or by taking its equivale elsewhere.

PROBATION

A student whose quality-point index falls below 2.00 after completing a minimum of 12 semester hours of study will be placed on probation. This probation extends over the period in which the student attempts 12 semester hours of work, which may include remedial studies as prescribed.

SUSPENSION

A student whose quality-point index is 1.50 or below or whose index remains below 2.00 at the end of his probationary period may be suspended. A student suspended for poor scholarship may apply for readmission after the lapse of either the fall or spring semester. To be considered for readmission, he must pass prescribed tests and submit evidence to the Dean's Council that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student readmitted after suspension is on probation and must maintain a current quality-point index of at least 2.50 on each 12 semester hours of work undertaken until his cumulative index is 2.00. In no case will the probationary period after readmission exceed 24 hours of study. A student suspended twice for poor scholarship will not be readmitted.

CREDIT/NO CREDIT OPTION

A junior or senior student who has a cumulative quality-point index of 2.50 or better, may, with the approval of his adviser and the Dean, take one course a semester and receive a grade of *CR*, Credit, or *NC*, No Credit, which will be recorded on the student's transcript but will not be reflected in his quality-point index. No student will be allowed to take more than 4 credit/no credit courses. A student must sign up for such an option at registration. Under no circumstances may a student change from credit/no credit status to graded status, or vice versa, after the end of registration. Courses required in the student's major field may not be taken on the credit/no credit basis. A transfer student may not choose this option until the second semester of his enrollment in this University.

RESIDENCE

A minimum of 30 semester hours, including at least 12 hours in the major field, must be completed while registered in the School of Government and Business Administration. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Summer work may be counted toward the residence requirement, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in the School of Government and Business Administration.

USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the Dean. The Dean may assign supplementary work, without academic credit, varying in amount with the needs of

the student. If the work prescribed is equivalent to a course, the regular tuiti
fee is charged. The granting of a degree may be delayed for failure to ma
up such deficiency in English to the satisfaction of the Dean.

CORRESPONDENCE AND HOME-STUDY COURSES

Credit for correspondence or home-study courses is not acceptable and can
be applied toward a degree.

EARNING CREDIT OR WAIVING REQUIREMENTS BY EXAMINATION

A student may earn credit up to a maximum of 30 semester hours or wa
curricular requirements by performing satisfactorily on the following tests:

College-Level Examination Program (CLEP).—CLEP offers two types
examinations: (1) CLEP Subject Examinations are offered in 29 subject are
These tests measure achievement in the equivalent of specific college-le
courses. (Credit may not be earned by passing the examination after hav
taken the equivalent course.) CLEP examinations in Introductory Accounti
Introduction to Business, Commercial Law, and Data Processing are limited
3 credits each of advanced standing. All other CLEP examinations in Accou
ing and Business Administration (School of Government and Business Admin
tration courses) are not accepted for advanced standing. (2) CLEP Gener
Examinations—offered in five areas: Mathematics, Social Sciences, Humaniti
the Natural Sciences, and English Composition. (Credit—advanced standing
not given for the General Test in English Composition.) Students enrolled
George Washington University who wish to receive credit for CLEP Subje
Examinations must receive prior approval of the department.

Advanced Placement Tests.—See page 23.

Achievement Tests.—See page 24.

Examinations for Waiving Curriculum Requirements.—A required cour
may be waived by the satisfactory passing of a waiver examination authoriz
and prescribed by the department or curriculum adviser concerned. Passi
this examination does not entitle the student to any hours of credit toward th
degree. Request to take the examination should be made to the curriculu
adviser and the required fee paid at the Office of the Cashier before the da
set for the examination.

CURRICULUM REQUIREMENTS

One hundred and twenty semester hours of course work are required for gradu
ation. To be recommended by the Faculty for graduation, candidates are r
quired to complete, in addition to the appropriate freshman and sophomo
work, a minimum of 60 semester hours (second-group course work) in th
junior and senior years selected from one of the two major field curricu
offered by the School.

Curriculum for the First Two Years in Accounting and Business Administration

Freshman Year

		Semester Hours
Acct:	Acct 1–2	6
Econ:	Econ 1–2	6
Engl:	Engl 9 or 10, 11	6
Science:	BiSc 3–4 or 11–12; Chem 3–4 or 11–12; Geog 51 and 52; Geol 1–2; or Phys 1 and 2, 3 and 4, or 9–10	6–8
*Elective:	Courses other than in Accounting, Business Administration, or Economics	4–6
	Total	30

Sophomore Year

BAd:	BAd 51	3
Humanities:	Art 31–32 or 71–72; Chin 3–4; Engl 51–52, 71–72, or 91–92; Fren 3–4 or 6, or 51–52; Germ 3–4 or 51–52; Ital 3–4; Mus 3 and 4; Slav 3–4, 5–6, or 91–92; Span 3–4 or 6, or 51–52; or SPDR 1 and 11 (Accounting majors may postpone this requirement until the junior year if they wish to take Acct 121 or 191 in the sophomore year)	6
Math:	Math 31 and 32, or 51 and 52	6
Social Studies:	Psyc 1, 8	6
	Anth 1–2, Hist 71–72, PSc 4 and 6 or 5 and 6, or Soc 1 and 2	6
Stat:	Stat 51	3
	Total	30

Accounting Major

Junior Year

Acct 101:	Cost and Budgetary Control	3
†Acct 121:	Intermediate Accounting	3
Acct 161:	Federal Income Taxation	3
†Acct 191:	Advanced Accounting	3
BAd 102:	Fundamentals of Management	3
BAd 131:	Business Finance	3
BAd 141:	Basic Marketing Management	3
BAd 161:	Commercial Law	3
Mgt 118:	Introduction to Information Technology	3
Elective:	Selected from courses other than in Accounting Business Administration, or Economics	3
	Total	30

* Courses in Human Kinetics and Leisure Studies may not be taken for credit.
† If Acct 121 and 191 are elected in the sophomore year, students replace this requirement with 6 semester hours of Humanities (see above).

Senior Year

Acct 132:	Accounting Theory
Acct 171:	Auditing
Acct 181:	Accounting Systems
BAd 101:	The Business Environment
BAd 181:	Manufacturing Production
BAd 198:	Business Policy and Administration
Econ 121:	Money and Banking
Stat:	Three semester hours selected from the following
Stat 111:	Business and Economic Statistics I
Stat 155:	Introduction to Probability
Stat 187:	Theory of Sampling
Elective:	Three semester hours selected from courses in Accounting*, Business Administration, or Economics, and three semester hours selected from courses in other departments
	Total

NORMAL SCHEDULE FOR ACCOUNTING COURSES

Junior Year: Fall—Acct 101, 121 (if not elected in sophomore year), 161. Spring—Acct 191 (if not elected in sophomore year), 161 (if not elected in fall).
Senior Year: Fall—Acct 171; Spring—Acct 132, 181.

ACCOUNTING PRACTICE INTERNSHIP

An internship program, limited to selected senior Accounting majors, is available during the semester break of the senior year. To be admitted to this program students must have the approval of the Chairman of the Department of Accounting and must have completed at least 15 semester hours of Accounting courses (including a course in auditing) with a 2.85 or higher average and an over-all grade of 2.50 by the end of the fall semester. Students will be paid a salary while conducting audits under senior supervision of participating C.P.A. firms. Other internships with industry and government are available. Students who complete the internship successfully will register for Acct 199 the spring semester of their senior year and will receive 3 semester hours of credit. For further information consult A.J. Mastro, Chairman of the Department of Accounting.

Business Administration Major

The program in Business Administration is designed to provide the broad foundation required for eventual top leadership in either governmental or business administration. It consists of the 36 semester hours of *required* courses: 1

* Qualified students accepted in the Accounting Internship program will elect Acct 199 in place of 3 semester hours of elective selected from courses in Accounting, Business Administration, or Economics

ours* in one of the following group options; and 9 hours of electives, normally dvanced courses in liberal arts subjects.

Junior Year

		Semester Hours
Acct 193:	Business Budgeting	3
BAd 102:	Fundamentals of Management	3
BAd 105:	Personnel Management	3
BAd 131:	Business Finance	3
BAd 141:	Basic Marketing Management	3
Mgt 118:	Introduction to Information Processing	3
Group Option:	Six semester hours selected from the chosen area of specialization (see below)	6
Elective:	To be selected in consultation with the adviser	6
	Total	30

Senior Year

BAd 101:	The Business Environment	3
BAd 161:	Commercial Law	3
BAd 181:	Manufacturing Production	3
†BAd 198:	Business Policy and Administration	3
Econ 121:	Money and Banking	3
Psyc 144:	Personnel and Industrial Psychology	3
Group Option:	Nine semester hours selected from the chosen area of specialization (see below)	9
Elective:	To be selected in consultation with the adviser	3
	Total	30

GROUP OPTIONS

Eight areas of specialization are open to Business Administration majors. The 15 hours taken in each of these options require the approval of the adviser. The group option and the individual courses within the option should be selected *at the beginning of the junior year*. The student should contact the Chairman of the Department of Business Administration for assignment of an adviser.

GROUP I: ECONOMICS

The following courses provide the basic academic foundation for such positions as financial economic analyst, industrial economic analyst, and market research analyst in business and government.

BAd 132: International Business Finance
BAd 133: Capital Formation
BAd 176: International Business Theory and Policy

* Students who choose the group option in International Business are required to take only 12 semester hours of courses in that group if they have received credit for two years of modern foreign language, or the equivalent.
† International Business majors must complete BAd 178 in lieu of BAd 198.

*Econ 101:	Intermediate Microeconomic Theory
*Econ 102:	Intermediate Macroeconomic Theory
Econ 158:	Industrial Organization
Econ 161, 162:	Public Finance I, II
Econ 181–82:	International Economics
Stat 111, 112:	Business and Economic Statistics I, II

GROUP II: FINANCE

The following courses provide the basic academic foundation for such positions as credit analyst, supervisor in a financial institution, bond cashier, trust officer, bank examiner, and similar positions in federal or international financial institutions.

*Acct 111:	Financial Statement Analysis
Acct 121:	Intermediate Accounting
BAd 113:	Real Estate
BAd 121:	Fundamentals of Insurance and Risk Management
BAd 122:	Insurance and Estate Planning
BAd 132:	International Business Finance
BAd 133:	Capital Formation
*BAd 138:	Investment and Portfolio Management
Econ 101:	Intermediate Microeconomic Theory

GROUP III: INFORMATION PROCESSING

The following courses provide the basic academic foundation for positions in information processing in government, business, and industry. They also give the student an understanding of the manager's use of information processing as a vital managerial technique.

*Mgt 119:	Computer Programming for Information Systems
*Mgt 120:	Information Systems Development I
*Mgt 121:	Information Systems Development II
*Mgt 122:	Special Studies in Information Systems

One additional 3-semester-hour course approved by the adviser

GROUP IV: INTERNATIONAL BUSINESS

The following courses provide the basic academic foundation for positions in international business, both in private industry and in government. Students in this option who have received credit for two years of a modern foreign language, or the equivalent, are required to take only 12 semester hours from the following courses.

*BAd 132:	International Business Finance
*BAd 144:	International Marketing Management
BAd 171:	Principles of Transportation
*BAd 175:	Introduction to International Business
BAd 176:	International Business Theory and Policy
*BAd 178:	International Business Policy and Operations
Econ 181–82:	International Economics

GROUP V: MARKETING

The following courses provide the basic academic foundation for such positions as sales manager, marketing manager, product development manager, research director, buyer, advertising director, sales promotion manager, and credit manager.

*BAd 143:	Marketing Research

* Required for this group option.

BAd 144: International Marketing Management
*BAd 145: Sales Management
BAd 147: Advertising
BAd 158: Physical Distribution Management
BAd 171: Principles of Transportation
BAd 175: Introduction to International Business
BAd 178: International Business Policy and Operations

GROUP VI: PERSONNEL MANAGEMENT

The following courses provide the basic academic foundation for such positions as personnel manager, employee relations manager, and employment manager in business and government service.

*BAd 106: Problems in Personnel Management
*BAd 107: Collective Bargaining
Jour 145: Principles and Problems of Public Relations
Psyc 129: Theories of Personality
Psyc 131: Psychological Tests
SPDR 121: Group Discussion and Conference Leadership

GROUP VII: STATISTICS

The following courses provide the basic academic foundation for such positions as financial statistician, planning statistician, industrial statistician, and rate analyst in business and government.

Stat 91: Principles of Statistical Methods
Stat 110: Quality Control and Reliability Techniques
*Stat 111, 112: Business and Economic Statistics I, II
Stat 117: Analysis of Variance
Stat 118: Regression Analysis
Stat 155: Introduction to Probability
Stat 157–58: Introduction to Mathematical Statistics

GROUP VIII: TRANSPORTATION AND LOGISTICS

The following courses provide the basic academic foundation for management positions in transportation firms and in traffic departments of other types of business firms and government agencies. The program should also aid in the preparation for the examinations for membership in the American Society of Traffic and Transportation.

BAd 158: Physical Distribution Management
*BAd 171: Principles of Transportation
BAd 172: Public Utilities
*BAd 173: Transportation Systems Management
BAd 174: Urban Transportation
BAd 175: Introduction to International Business
CE 183: Urban Planning
Geog 125: Transportation Geography

* Required for this group option

Master of Business Administration.—The degree of Master of Business Administration is this School's top professional Master's degree in business. It is designed to develop the analytical ability and perspective which will contribute to success as a responsible executive. Because of the increasingly close relationship between government and business, the programs for this degree also provide an excellent background for many government careers.

Master of Arts in Government.—The degree of Master of Arts in Government with an emphasis on Public Administration is for students who wish to concentrate on certain areas of administrative specialization. These areas include urban problems, urban and regional planning, development administration, and research and development administration.

Master of Public Administration.—The degree of Master of Public Administration is primarily for those already in government service—federal, state, local, intergovernmental, or international—or for those seeking management careers in government. The program provides students with an appreciation of the special requirements of public service, while at the same time helping them to improve their own analytical and decisional capabilities. The degree is interdepartmental in nature, but the major emphasis is in the Department of Public Administration. This degree, as well as the degree of Master of Arts in Government, meets the standards of the National Association of Schools of Public Affairs and Administration.

Master of Arts in Health Care Administration.—This professional degree is designed to prepare students with interdisciplinary training for professional practice in administration and planning roles in public and private health organizations. Study in depth may be made in various aspects of Health Care Administration found in short-term hospitals, long-term health facilities (such as extended-care institutions, nursing homes, mental hospitals, facilities for the aged), group practice clinics, health information systems, and comprehensive health planning agencies.

Master of Urban and Regional Planning.—This professional planning degree is designed as preparation for careers on the municipal, county, state, and national levels in both public service and private consulting practice. The program of study is planned to provide a broad professional education, to develop competence in planning theory and methodology, and to emphasize the analytical ability and creativity necessary for solving urban and regional problems.

Master of Science in Administration.—The Master of Science in Administration degree is offered only off campus. It provides a course of study appropriate for those students currently working in government and business. It is a professional degree, preparing graduates for higher positions and greater responsibility and generally improving their competence as administrators.

ENTRANCE REQUIREMENTS

A Bachelor's degree from a regionally accredited college or university that includes at least 90 semester hours of academic work, with an overall undergraduate quality-point index of 2.5 (on a 4.0 scale) and a score of at least

he 50th percentile on the applicable admission test, is required.

Students with an undergraduate quality-point index of 3.0 (a *B* average) nay be admissible without an admission test.

Students whose undergraduate quality-point index is less than 2.5 or whose dmission test score ranks beneath the 50th percentile will be admitted if (1) he quality-point index multiplied by 200 and added to the admission test core equals 950 points, or (2) the upper division undergraduate (last two ears of undergraduate work) quality-point index multiplied by 200 and added o the admissions test score equals 1,000 points.

Applicants for admission to programs leading to the degree of Master of Business Administration must submit acceptable scores on the Admission Test for Graduate Study in Business; applicants for admission to programs leading to the degrees of Master of Arts in Government, Master of Arts in Health Care Administration*, Master of Public Administration, and Master of Urban and Regional Planning must submit scores on the Admission Test for Graduate Study in Business *or* the Graduate Record Examination. It is the responsibility of the applicant to make arrangements for the required test with the Educational Testing Service, Princeton, N.J. 08540. Correspondence concerning the Admission Test for Graduate Study in Business should be addressed to Box 966; concerning the Graduate Record Examination, to Box 955.

GENERAL REQUIREMENTS

A program of greater length, including undergraduate background courses, may be assigned for an applicant whose undergraduate degree was in a field other than the graduate program he wishes to follow, or whose undergraduate record indicates a weakness in required background courses.

Master's degrees are awarded by vote of the Faculty on completion of the required course work, an acceptable thesis (if one is elected or required) or the equivalent work, and the passing of the Master's Comprehensive Examination. An applicant whose background does not include the necessary courses must take a program longer than the minimum hours required.

Second-group courses (numbered 101-200) may be counted toward the Master's degree only when registration for graduate credit has been approved at the time of registration by the Dean and the curriculum adviser. No work counted toward a Bachelor's degree may also be counted toward a Master's degree.

Full-time students are normally expected to register for 9 to 12 semester hours each semester. A graduate student who is employed more than 20 hours a week may not take more than 6 semester hours. All work for a Master's degree *must be completed in five years*, unless an extension of time is granted by the Dean. Continuous registration does not serve the purpose of extending a student's degree candidacy beyond the five-year time limit.

A student who expects to continue his studies for the degree of Doctor of Business Administration or Doctor of Public Administration after receiving the Master's degree should ask for assistance in planning his program so that he may qualify for admission to candidacy for the Doctorate.

* Scores on the Miller Analogies Test are also accepted in place of the Admission Test for Graduate Study in Business or the Graduate Record Examination for admission to the program of study leading to the degree of Master of Arts in Health Care Administration. The Miller Analogies Test is offered through the auspices of universities nationally.

No credit is granted for work done *in absentia* or without formal instruction except for hospital residency, supervised field experience, and the thesis, which may be completed *in absentia* with the permission of the department, curriculum adviser, or committee concerned.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to individual course examinations the candidate must pass a general written Master's Comprehensive Examination. In writing the examination the student is expected to correlate what he has learned in his course work and his reading in the literature of his fields. The examination normally requires from seven to nine hours writing time. Sections broadly cover the various fields in which the candidate has prepared himself.

The examinations are scheduled three times a year, in late November or early December, April, and August, and should be taken during the last semester of course registration or shortly after completion of the prescribed course work. The student must have completed all core requirements before being eligible to take the examination. If there is a lapse of time between completion of course work and the taking of the examination, the student must maintain continuous registration and must be registered for the semester or summer session in which the examination is taken.

The candidate should consult with his adviser, well in advance, as to the date of his examination and the definition of the subject-matter fields which his examination is to cover. A written application is filed with the department supervising the student's elective field of study no later than 30 days prior to the examination date. Before applying for the examination, the student must have completed all of the courses in his program or be enrolled in his last semester and he must have achieved a 3.00 (*B*) average. After applying for the Examination, a candidate may withdraw only by notice in writing to his Department Chairman.

A candidate who fails the examination may, in exceptional circumstances and with specific approval of his advisers, repeat the examination, but only after the lapse of one semester and the undertaking of additional preparation as prescribed. ***If he fails a second time, no further opportunity to take the examination will be permitted.***

SCHOLARSHIP

Grades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; and *CR*, Credit.

An average of *B* or better is required for the Master's degree. The grade of *C* is not considered as failing but must be counter-balanced by a grade of *A* in a graduate course of equal status.

A Master's degree candidate who receives a grade of *F* is required to present cause for consideration by the Dean's Council as to why he should be allowed to continue his studies toward a degree objective.

INCOMPLETE/AUTHORIZED WITHDRAWAL

Conditions under which the grades of *I* (Incomplete) or *W* (Authorized Withdrawal) may be assigned are described on page 46.

Removing an Incomplete.—The grade of *I* must be removed no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of *I* is assigned. An "Incomplete" that is not removed within this period is automatically changed to an *F*. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the Dean, or the appropriate committee, for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere.

REQUIRED COURSES IN ADMINISTRATION (Certain Fields)

The following courses in general administrative theory and practice are *required* of all candidates for the degree of Master of Business Administration and Master of Public Administration.

		Semester Hours
Mgt 201:	Advanced Administrative Management	3
Mgt 204:	Quantitative Factors in Administration	3
Mgt 207:	Human Behavior in Organizations	3

In addition, each student is normally required to take, from the following group, the course appropriate to his specific area of concentration:

Acct 276:	Management Planning and Control	3
BAd 257:	Operation of the Multinational Firm	3
BAd 297:	Business Policy Formulation	3
HCA 206:	Case Studies in Health Care Administration	3
PAd 214:	Policy Analysis in Public Administration, or	
PAd 260:	Policy Formulation and Administration	3

THE THESIS

Students contemplating doctoral study are strongly urged to include the thesis as a part of their Master's program. The thesis subject should be selected as early as possible so as to permit effective integration with the course work.

The subject must be approved by the professor in charge of the student's field. The thesis in its final form must have the approval of the professor in charge and must be presented to the Dean by the student no later than the date announced in the calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the two semesters he registers for thesis (299–300), to the advice and direction of the member of the Faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional successive academic year is granted without further tuition payment. The student must, however, maintain continuous registration during this period. If the preparation of the thesis extends more than three semesters beyond the date he registers for thesis 300, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

OPTIONAL MASTER'S PROGRAM WITHOUT A THESIS

A thesis is required in certain degree programs and optional in others. In those programs where a thesis is optional and the student elects not to write one, the student must take a course in research methodology and one other elective.

MASTER OF BUSINESS ADMINISTRATION

Except for the field of concentration in Accounting*, curricula leading to the professional degree of Master of Business Administration include the following:

1. *The recognized Common Body of Knowledge in business administration.* Except for "policy courses," this may be fulfilled by waiver for prior work completed or by completing the courses listed below with a QPI of 3.00 or higher. A student with an undergraduate degree in business administration from an accredited institution is regarded as having completed the Common Body of Knowledge.

Semester Hours

The Common Body of Knowledge Courses
Acct 1–2, or 115 and 193; BAd 131, 141, 161, and 181; Econ 1–2 or 217–18; Mgt 203; and Stat 51 or 111

2. *Required Courses in Administration*
Mgt 201, 204, and 207
One policy course, as appropriate, selected from BAd 257, 297; or HCA 206

3. *Field of Concentration* (see pages 151–54.)
Twelve semester hours of course work, planned and scheduled with the student's academic adviser

4. *Research Requirement*
Students electing to write a thesis will complete the appropriate thesis course (299-300); those not electing to write a thesis will complete one of the appropriate courses selected from BAd 295, Mgt 295, PAd 295, Acct 295, HCA 295 or UR&P 295, plus one 3 hour semester elective

5. *Elective*
Depending upon the student's previous academic work in the Common Body of Knowledge

---

All students must complete a minimum of 36 semester hours of graduate course work. No more than 6 hours of graduate course credits can be transferred from other accredited institutions, and each transfer of credit must be approved by the Dean.

The degree of Master of Business Administration is awarded by vote of the Faculty upon the satisfactory passing of the Master's Comprehensive Examination, and the submission of an acceptable thesis if one is required.

The Master's Comprehensive Examination may not be taken before the third semester of course work.

---

* For the curriculum leading to the degree of Master of Business Administration with a field concentration in Accounting, see page 201.

IELDS OF CONCENTRATION

udents select a minimum of 12 semester hours from one of the following elds of concentration.

CCOUNTING

he field of concentration in Accounting is designed to provide a contemporary, road-based academic preparation which will apply equally to the fields of accounting in government, industry, and public practice as well as to the field of eneral administration employing accounting as an effective means of understanding the organization. (See page 201 for program of study.)

DMINISTRATION OF SCIENCE AND TECHNOLOGY

The field of concentration in Administration of Science and Technology explores the many aspects of technology relating to and influencing research and development management, business, and public policy. The employment of "state-of-the-art" technology and the creation of new technology through research and development are important processes in the achievement of the objectives of both private firms and governments.

The research and development environment has many unique operational characteristics. The program of graduate study in this concentration has been designed to identify and study the problems associated with managing creative professional people in a dynamic technology. As a contextual area, the program stresses the need for students to undertake original and meaningful research involving political, economic, sociological, and operational problems encountered by management in industrial, governmental, and military research and development organizations.

BEHAVIORAL SCIENCES IN ORGANIZATION DEVELOPMENT

The curriculum in this program reflects the assumption that the effective utilization of the behavioral sciences is concerned with both means and ends; that the specialist in behavioral science not only is skilled in theory and research but also applies his technical and specialized knowledge as a conscious force in effective organizational growth and improvement. Thus, courses are designed to equip the student with organizational concepts and behavioral skills appropriate to optimizing the utilization of a system's total resources.

This program is designed to fulfill the need for professionals capable of designing, creating, and developing the necessary behavioral and organizational systems appropriate to rapidly changing societies. Emphasis is on the interrelationships of such dimensions as motivation, leadership, problem-solving, organizational growth, and increased complexity of modern organizations and their effect upon the functions of organizational development.

BUSINESS-GOVERNMENT RELATIONS

This field of concentration provides a knowledge and understanding of the total business environment essential to business policy formulation and execution; gives a keener appreciation of the role and function of business in a free enterprise society, its environmental needs for optimum effectiveness, and what gov-

ernment can and should contribute to that environment; familiarizes studen with successful techniques by which the content and direction of public polic toward business can legally be influenced; and provides students with a thorough knowledge of current government policies toward business, contemporary issue affecting government-business relations, and possible solutions to problems i this area.

This field serves the needs of students of the business environment at th Master's and Doctoral levels and is based on the premise that the enormous in fluence of government on buiness and vice-versa—exercised in the roles o regulator, customer, supplier, protector, and competitor—will become ever more pervasive and that business policy formulation and execution and business decision-making will become increasingly dependent upon thorough knowledg and understanding of the total environment of business and, most importantly of government policies, programs, and laws affecting business.

FINANCE AND INVESTMENTS

The field of concentration in Finance and Investments prepares students fo careers in finance and investments, providing a background in business budge ing, controllership, treasury, long-range planning, reporting, and financial man agement processes. Courses are designed to emphasize the planning, analysis implementation, and controls necessary for making effective financial decisions Instruction not only applies to manufacturing and trading enterprise but, in ad dition, includes railroad and public utility financing. Each, however, has di tinctive operating features. Most financial dogmas have a universality that cu across business lines, and variations are more a matter of degree than a form substantive difference.

HEALTH CARE ADMINISTRATION

The program of study for the field of concentration in Health Care Administra tion consists of both on-campus academic studies and off-campus field practic assignments. Ordinarily full-time students can expect to complete the entir degree program within two years, provided they have the background course for admission to the Master of Business Administration degree program.

INFORMATION SYSTEMS TECHNOLOGY

The field of concentration in Information Systems Technology is designed t provide a managerial understanding of the principles of manual, mechanic and electronic information processing, including computer programming co cepts, methods, and languages; an appreciation of the capabilities, limitation and selection procedure of information processing equipment; a knowledge o all phases of management information systems development, implementatio and evaluation; and an understanding of the roles of both management a systems personnel in information technology. It also provides an appreciati of the role of information systems technology as a tool of management.

Students actually participate in the development of management informatio systems; in the selection of computer equipment; and in the installation, ma agement, and evaluation of management information systems—during cla sessions.

INTERNATIONAL BUSINESS

The field of concentration in International Business is designed to prepare students for careers in firms operating on a multinational basis or about to enter the international field; for careers in the federal government and in international agencies concerned with business, industry, and finance abroad; and for the Commerce option of the Foreign Service Officer Examination.

This program is also designed to provide foreign students with the background and skills necessary to promote international business, and to prepare them for careers in foreign and domestic firms within their own countries and for commercial officer positions within their governments.

Each student's program is individually developed by the student's adviser according to the student's background and interests.

APPLIED ECONOMICS

The field of concentration in Applied Economics is the study of economic institutions and analytical methods, taken from the point of view of business or governmental management. Its purpose is to develop (1) a broad understanding of the tools of economics; (2) an analytical power with respect to various facets of an organization's activity or multi-organizational areas of special interest; (3) a skill in problem-oriented applications of economic tools; (4) an ability to interpret historical development and predict future trends in firms, industries, and economies; (5) a familiarity with the institutional setting of economic activity; and (6) an appreciation of the economic reasoning behind public policies.

With a strong orientation to the economic problems of organizations, this field of concentration is based on the methodology of general economics, which it supplements with the methods of management science.

Applied economics presumes skills in quantitative methods, statistics, and intermediate-level general economics. It is offered in a sequence that commences with courses based on microeçonomic and macroeconomic tools respectively.

MARKETING

The field of concentration in Marketing encompasses all phases of supply and demand, from procurement and materials handling to product presentation and distribution. A student may concentrate in several subfields: marketing research, sales management, advertising, retailing, and international marketing. In addition, study may be complemented with courses from fields such as anthropology, geography, journalism, mathematics, psychology, sociology, and others.

OPERATIONS RESEARCH AND SYSTEMS ANALYSIS

The field of concentration in Operations Research and Systems Analysis develops a thorough understanding of quantitative or mathematical approaches to problems of managerial control and decision-making. While the program will develop a competent background in basic mathematical theory associated with the various techniques, it is oriented toward applications of the techniques rather than their theoretical mathematical content.

PERSONNEL MANAGEMENT

Personnel Management is concerned with all aspects of the employment
human resources in business organizations. It is a challenging field—dynam
and rapidly growing in scope and importance. Career opportunities are open
domestic and international business organizations, hospitals, trade associations
research and educational institutions, and local, state, and federal governmen
agencies. Courses encompass all phases of the recruitment, selection, employ
ment, and development of people, industrial relations, unionism, collective ba
gaining, labor relations, and manpower utilization.

PROCUREMENT AND CONTRACTING

The field of concentration in Procurement and Contracting responds to the re
ognized need for greater professionalism and sophistication among those en
gaged in procurement activities of the federal government and in contractin
activities of vendors to the federal government.

The sustained increase in federal purchasing—in volume, variety, and com
plexity—places ever greater demands upon the skill and resourcefulness of pro
curement and contracting personnel. The field has therefore been designed wit
the following objectives: (1) to provide a broad professional education in th
knowledge and skills necessary for success in this field; (2) to develop in th
student increased ability in analysis, decision-making, and communications; (3
to increase the student's appreciation of the economic, social, legal, and tech
nological consideration present in procurement and contracting activity.

MASTER OF PUBLIC ADMINISTRATION

Graduate-level work in public administration in the nation's capital offer
special attractions and unusual opportunities not available to students else
where. Because of its pre-eminence, the federal government influences state
regional, and local, as well as international systems. National political figures
and professional governmental administrators are often available to students.
National and international events take place around them. The classes students
attend in the School of Government and Business Administration are physi
cally close to the Office of Management and Budget, the Civil Service Com
mission, the State and Interior Departments, the World Bank, the International
Monetary Fund, and many smaller agencies. The specialized libraries of these
institutions are frequently used by graduate students.

The degree of Master of Public Administration is a 36-credit-hour degree
Twenty-one of the 36 credit-hours must be taken in courses offered by the
Department of Public Administration. The degree is awarded by vote of the
faculty upon the candidate's satisfactory completion of course requirements a
passing of the Master's Comprehensive Examination. The writing of a master
thesis is optional.

Because the public service requires a wide variety of expertise, students with
all undergraduate degree backgrounds are considered for admission. There are
no prerequisites. No more than six semester hours of graduate credit can be
transferred from other accredited institutions and transfer of credit must be
approved by the Dean of the School.

Required courses in Public Administration constitute one of the two areas covered by the Master's Comprehensive Examination. This area consists of 12 to 15 hours of certain core courses, depending upon the student's previous experience. The course work emphasizes four major fields: the nature of public administration, policy analysis, organizational theory, and public expenditure analysis and evaluation. Work in this area includes the following courses:

PAd 210 Concepts and Issues in Public Administration
PAd 214 Policy Analysis in Public Administration
or
PAd 260 Policy Formulation and Administration
PAd 221 Organization Theory and the Public Sector
or
PAd 223 Behavioral Factors in Large Organizations
PAd 252 Public Expenditure Analysis and Evaluation

Students who have not done work in American administrative institutions are required to take *one* of the following:

PAd 213 Administration in the Federal Government
PAd 245 Intergovernmental Relations
PAd 250 Administration in State and Local Governments

The second area covered by the Master's Comprehensive Examination is Administrative Theory and Practice. Course work in the area consists of 9 credit-hours and includes the following courses:

Mgt 201 Advanced Administrative Management
Mgt 204 Quantitative Factors in Administration
Mgt 207 Human Behavior in Organizations

Electives approved by the adviser may be selected to fulfill the remaining credit hours of the 36-hour requirement. In selecting electives, students are urged to consider one of the areas of concentration indicated for the degree of Master of Arts in Government (see page 156).

MASTER OF URBAN AND REGIONAL PLANNING

The program of graduate study in Urban and Regional Planning leads to the professional planning degree of Master of Urban and Regional Planning. It is designed as preparation for careers on the municipal, county, state, and national levels, and for private professional practice. The course of study is designed to provide a broad professional education, to develop competence in planning theory and methodology, and to emphasize the analytical ability and creativity necessary for solving urban and regional problems. Each student's program is designed in consultation with an assigned faculty adviser in accordance with his individual career plans.

The degree is awarded by vote of the Faculty after satisfactory completion of (1) from 45 to 60 semester hours of course work, depending upon the background and experience of each individual student, including a thesis equivalent to 6 semester hours (most students will ordinarily be required to take 60 semes-

ter hours); (2) a minimum of three months' full-time professional training in a planning agency under qualified supervision, with an acceptable written report to be submitted after completion of the training period; (3) a written Master's Comprehensive Examination; and (4) a thesis based on the candidate's research in the field of urban and regional planning.

MASTER OF ARTS IN GOVERNMENT

This degree is for students who wish to specialize in an area of administration important to the public service. Students with all undergraduate degree backgrounds are considered for admission. There are no prerequisites. No more than six semester hours of graduate credit can be transferred from other accredited institutions and transfer of credit must be approved by the Dean of the School.

The degree of Master of Arts in Government is a 36-credit-hour degree. Twenty-one of the 36 credit-hours must be taken in courses offered by the Department of Public Administration. The degree is awarded by vote of the faculty upon the candidate's satisfactory completion of course requirements and passing of the Master's Comprehensive Examination. The writing of a master's thesis is optional.

The Comprehensive Examination covers the area of Public Administration and one other area of concentration selected by the student and approved by the adviser.

In the area of Public Administration students are required to take certain core courses consisting of 12 to 15 hours of course work, depending upon their previous experience. These core courses are identical to those required for candidates for the degree of Master of Public Administration (see pages 154-55).

Students must select one of the following 12 fields of specialization for the public administration option:

Urban Administration (12 hours)
Urban and Regional Planning (9 hours)
Public Personnel Administration (9 hours)
Budgeting and Finance (9 hours)
Policy Analysis and Evaluation (9 hours)
Development Administration (9 hours)
Manpower Management (9 hours)
Health Care Administration (12 hours)
Behavioral Science (9 hours)
Information Technology and Systems Management (9 hours)
Research and Development Administration (9 hours)
International Management (9 hours)

Electives approved by the adviser may be selected to fulfill the remaining credit hours of the 36-hour requirement. In selecting electives students are urged to consider the Administrative Theory and Practice area of concentration indicated for candidates for the degree of Master of Public Administration (see page 155).

MASTER OF ARTS IN HEALTH CARE ADMINISTRATION

The program of study leading to the degree of Master of Arts in Health Care Administration consists of a basic minimum two-year period of graduate study, normally including both on-campus academic studies and off-campus field practice assignments. The length of each period is dependent upon the study-in-depth concentration, which the student elects. The majority of students begin their studies in the fall semester of each year. However, a limited number of qualified students may be admitted to begin their course work in the spring semester and summer sessions. The basic curriculum is developed in keeping with the background and professional goals of each student and ordinarily consists of a minimum of 48 semester hours. Undergraduate courses in Accounting, Economics, and Statistics are required as a prerequisite for all of the concentrations in this program.

Ordinarily full-time students can expect to complete the on-campus phase of the degree program in two to three semesters, and the administrative residency or field practice in one to two calendar years. The total time depends on past academic course work and experience in the health care field.

Students will select one of the following concentrations: Administration of Long-term Care Facilities, Comprehensive Health Planning, Health Information Systems, or Hospital Administration.

ADMINISTRATION OF LONG-TERM CARE FACILITIES

The concentration in Administration of Long-term Care Facilities is designed to prepare students for administration in such areas as nursing homes, facilities for the aged, mental hospitals, and community health clinics.

During the first phase the student must complete a satisfactory academic program of course work, selected in accordance with his background and needs. These courses cover the general technical background of health care administration, general administrative theory and practice, and problem-solving in the management of extended care and long-term care patients.

The second phase is a period of field experience as an administrative resident under a qualified preceptor. A written major report or selected field project reports are required.

COMPREHENSIVE HEALTH PLANNING

The concentration in Comprehensive Health Planning is designed to prepare students to plan for and coordinate all aspects of private and public health care systems in accordance with sound management principles. It is an interdisciplinary program which includes courses from (1) health care administration; (2) health care planning; (3) supporting disciplines such as sociology, urban and regional planning, quantitative methods, public administration; and (4) a particular area of concentration selected by the student to gain a specific skill.

In addition to the course work there are periods of supervised field experience. Written reports are required.

HEALTH INFORMATION SYSTEMS

The concentration in Health Information Systems recognizes the rapidly growing demand for individuals who can develop and implement the use of computer-based information systems in decision-making approaches. It is designed to prepare those who wish to supervise and coordinate data collection, processing, and retrieval activities for health care complexes.

During the first phase the student must complete a satisfactory academic program of course work, selected in accordance with his background and needs. These courses cover the general and technical background of health care administration and general administrative theory and practice. In addition students must complete required courses in computer services and information handling.

The second phase consists of supervised field experience, which includes written reports.

HOSPITAL ADMINISTRATION

The concentration in Hospital Administration is divided into two phases. During the first phase the student must complete a satisfactory academic program of course work, selected in accordance with his background and needs. These courses cover the general and technical background of health care administration, general administrative theory and practice, and problem-solving in the area of management as it relates to short-term care hospitals.

The second phase is a period of field experience as an administrative resident under a qualified preceptor. A written major report or selected field project reports are required.

Post-Master's Graduate Certificate in Health Care Administration

STUDENTS WITH APPROVED MASTER'S DEGREES from accredited institutions may take a special Post-Master's program leading to a Post-Master's Graduate Certificate in Health Care Administration. Each program will be planned to meet the professional needs of the individual student, whether he wishes to undertake a new field of study or to amplify his knowledge of work done at the Master's level.

This program permits study in depth of such areas as health care administration consulting; comprehensive health planning; government health care administration at federal, state, and county levels; long-term care administration, including mental hospitals, nursing homes, and facilities for the aged; and health care administration research.

Prerequisite: a Master's degree from an accredited college or university and an academic average which indicates the ability to undertake advanced study. The applicant is also judged on his experience, character, and personality. Applicants lacking formal study in health care administration are required to take qualifying courses.

EQUIREMENTS FOR THE CERTIFICATE

lost students with adequate preparation in the health care field should be ble to complete the requirements by taking a program of study with a mini- um of 30 semester hours of course work. Those lacking such specialized udy will need more. At the discretion of the student's advisory committee a aximum of 6 semester hours may be transferred from another accredited stitution if the work was taken for credit toward a graduate degree.

ROGRAM OF STUDIES

CA 270 *Research in Health Care Administration*, HCA 285–86 *Readings in ealth Care Administration*, and HCA 288 *Seminar: Field Problem Studies in ealth Care Administration* are required of all candidates for the Certificate. he remaining courses consist of a program of study worked out in consul- tion with a faculty adviser and planned with consideration of the student's xperience and educational background and his specific professional objectives.

Doctoral Study

ORK FOR THE DEGREES of Doctor of Business Administration and Doctor of ublic Administration is supervised by the Committee on Doctoral Studies.

DMISSION

ompleted application forms must be sent to the Office of the Admissions Offi- er, School of Government and Business Administration, George Washing- on University, Washington, D.C. 20052. The applicant should ask three indi- iduals, who are acquainted with his ability to do high-level academic work, to rite directly to the Chairman of the Committee on Doctoral Studies. These etters of reference should be on special forms which will be provided by the ommittee Chairman. Applicants for the degree of Doctor of Business Admin- stration must file results of the Admission Test for Graduate Study in Business ith the Office of the Admissions Officer before final approval of their appli- ations can be given. Applicants for the degree of Doctor of Public Adminis- ration must submit results of either the Admission Test for Graduate Study in usiness *or* the Graduate Record Examination to the Office of the Admissions fficer. These tests must have been taken within the past five years. Arrange- ents to take these tests must be made with the Educational Testing Service, 0 Nassau Street, Princeton, N.J. 08540; or 1947 Center Street, Berkeley, Calif. 4704.

An applicant must have a degree of Master of Business Administration or Master of Public Administration, as appropriate; or a Master of Arts degree in an approved field; or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship. Each applicant must demonstrate his competence by qualifying examinations.

MANAGEMENT TOOL EXAMINATIONS

Professional qualifying examinations are normally given in two areas: accounting and quantitative methods (in the case of accounting, examinations are given in the public administration and in the business administration context(s). Except in unusual circumstances, these tool examinations will be taken during the first year of course work. Computer programming or a foreign language (where appropriate) can be substituted for accounting.

Doctoral students may have the opportunity to retake a failed tool examination only one time without petition. Unless subsequently approved by petition a second failure on a tool examination will constitute grounds for dismissal.

Accounting Option (D.B.A.).—If the following courses are taken and completed with a minimum grade of B in each course, the accounting tool examination will be waived: Acct 115, 215, and one course selected from Acct 262, 275, 276, 282, 295. If the student has previously successfully completed introductory accounting at the college level, Acct 115 (which is a prerequisite to Acct 215) will not be required.

Accounting Option (D.P.A.).—This option will be considered on an individual basis. All interested D.P.A. degree candidates should contact the Accounting Department Chairman for guidance.

Quantitative Methods Option (D.B.A. and D.P.A.).—If the following courses are taken and completed with a minimum grade of B in each course, the tool examination for quantitative methods will be waived: Mgt 203, 225, and 226. If the student has previously successfully completed a course in calculus at the college level during the preceding five years, Mgt 203 (which is a prerequisite to Mgt 225) will not be required.

PLAN OF STUDY

The fields of (1) Administrative Theory and Practice and (2) Applied Economics are required for the Doctor of Business Administration degree; the fields of (1) Administrative Theory and Practice and (2) American Political Process and Public Administration are required for the Doctor of Public Administration degree. The Chairman of the Committee on Doctoral Studies, in consultation with the applicant, will designate two elective fields of study and will appoint an adviser to guide the student in his work in each of the fields undertaken. Elective fields may be chosen from such areas as Accounting, Administration in Metropolitan Areas, Behavioral Sciences in Organization Development, Comparative and Developmental Administration, Finance and Investments, Government-Business Relations, Health Care Administration, Information Systems Technology, International Business Administration, Managerial Economics, Marketing, Operations Research, Personnel Management, Production and Procurement, Public Financial Management and Budgeting, Public Personnel Management, Management of Science and Technology, Transportation and Traffic, and Urban and Regional Planning. Most students will complete, prior to the General Examination, a minimum of 30 semester hours in graduate courses and such additional course work as may be prescribed by the adviser; but, the exact content of each program is determined in light of the student's background and competence after consultation with the appropriate faculty member in each of the fields undertaken.

Full-time students are normally expected to register for 9 to 12 semester urs each semester. All work for the Doctor's degree must be completed in e years unless an extension of time is granted by the Committee on Doctoral udies prior to the expiration of the time limit. All course work must be taken campus unless otherwise approved in advance by the Dean.

When the applicant has completed all course work and has satisfied his lviser and the Committee of his readiness to take the General Examination in e fields of study previously designated, the examination will be scheduled uring the following February or October.

Upon successful completion of the General Examination and approval of the bject of the doctoral dissertation, the student may be admitted to candidacy the Committee on Doctoral Studies. The candidate's research and the prepration of his dissertation are supervised by a Research Adviser designated by e Committee.

After admission to candidacy, the student must register for 24 hours of *Disertation Research* (399). Full-time students must register for 9 to 12 hours semester for 2 semesters, and for sufficient hours in the third semester to comlete the 24-hour requirement. Part-time students must register for 6 semester ours a semester for 4 semesters. If the dissertation has not been completed uring the time the student has registered for the required 24 hours, he must egister for 3 semester hours of *Dissertation Research* (399) each succeeding emester until the satisfactory completion of the dissertation and the final oral xamination.

Between 1974 and 1977, the School is conducting an experimental doctoral rogram. A small, carefully selected group of students will be permitted to neet doctoral requirements by alternative methods under the guidance of a faculty adviser and with the approval of the Committee on Doctoral Studies. Students wishing to be considered for inclusion in this experimental program should indicate this on their applications.

THE DISSERTATION

A dissertation is required as evidence of ability to perform scholarly research and to interpret and present its results.

No later than the date specified in the Calendar the candidate must submit to the Dean three complete copies of the dissertation and an original copy of an abstract of his dissertation for inclusion in the Announcement of the Final Examination and for reproduction by University Microfilms, Inc.

Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available in the Office of the Committee on Doctoral Studies. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee to cover the expense of printing the abstract of his dissertation, and for the basic service rendered by University Microfilms, Inc. (see page 31).

THE FINAL EXAMINATION

The Final Examination of the candidate consists of his oral defense of the dissertation and is given by a committee appointed by the Committee on Doctoral

Studies. Upon successful completion of this oral examination the candidate will be approved for the degree of Doctor of Business Administration or Doctor of Public Administration by the Committee on Doctoral Studies.

RESIDENCE

The Committee on Doctoral Studies expects all students to remain registered until *all* degree requirements are satisfied, although there is no formal regulation concerning the minimum amount of time of study either in preparation for the General Examination or as a doctoral candidate engaged in research. The student who undertakes either part of the doctoral program on a full or limited schedule must maintain "continuous registration" under the School of Government and Business Administration even when he is granted a leave of absence for study or residence elsewhere. By failing to register for one semester or more, the student breaks his registration and must apply for readmission to the School under whatever new conditions and regulations are set up by the Committee or the member of the Faculty who directs his research. The student who has completed his tuition requirements, but whose graduation is deferred for any reason, must maintain continuous registration by paying the continuous registration fee for the semester immediately preceding the graduation at which he expects to receive his degree.

Special Programs

GOVERNMENT MANAGEMENT INTERN SCHOLARSHIP PROGRAM

THE GOVERNMENT MANAGEMENT INTERN SCHOLARSHIP PROGRAM offers annually 50 scholarships to assist federal agencies in training carefully selected young men and women for administrative leadership in government career service. Each scholarship provides a tuition-free course of 3 semester hours a semester and interns who maintain satisfactory standing in both their academic program and their government training program may qualify for extension of the scholarship for one additional semester.

NAVY GRADUATE FINANCIAL MANAGEMENT PROGRAM

The Navy Graduate Financial Management Program, sponsored by the Naval Postgraduate School, provides 45 semester hours of work in financial management and related fields for a selected group of Naval and Marine officers. The Master of Business Administration degree is awarded upon successful completion of this full-year program.

CONTINUING EDUCATION IN HEALTH CARE ADMINISTRATION

A nondegree program is conducted in the various areas of health care administration both on campus and off campus whenever a sufficiently large class is organized. Institutes, workshops, and lecture series are conducted under the auspices of program faculty and selected leaders from local, state, and regional

reas on topics of current interest to the requesting organization. There is no pecific prerequisite. Fees are to be announced.

HE INTERNATIONAL INSTITUTE FOR HEALTH CARE ADMINISTRATION

n recognition of special educational needs of students from other countries, The International Institute for Health Care Administration offers programs of nstruction designed to meet these needs at either the degree or certificate level.

It is also equipped to enter into arrangements with principles of hospital sys-ems in world-wide areas to assist in the preparation of teaching programs or he actual instruction of administrative personnel either abroad or at the Uni-versity.

CERTIFICATION OF PUBLIC PURCHASING AGENTS

The School of Government and Business Administration participates in the Na-ional Institute of Governmental Purchasing professional certification program. Courses and examinations leading to qualification as "Certified Public Purchas-ng Officer" (CPPO) are provided. Inquiries may be directed to the School or to the National Institute of Governmental Purchasing, 1001 Connecticut Ave-nue, N.W., Washington, D.C. 20036.

BACHELOR OF SCIENCE IN HEALTH CARE ADMINISTRATION

The purpose of the program of study leading to the degree of Bachelor of Science in Health Care Administration is to develop persons who have a broad managerial education for beginning administrative and planning level positions in hospitals and related health organizations. At this time the degree program is limited to students in the Naval School of Hospital Administration at Bethesda, Md.

OFF-CAMPUS DEGREE PROGRAMS

The School of Government and Business Administration has academic jurisdic-tion over off-campus programs leading to the following degrees: Bachelor of Science in Administration with concentrations in accounting and business ad-ministration and the Master of Science in Administration.

These degree programs are administered by the College of General Studies. For details concerning the off-campus programs see the *College of General Studies* Catalogue.

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

Dean B.M. Sapin

FACULTY*

Professors Joseph Aschheim, R.H. Davidson, C.E. Galbreath (*Emeritus*), Marvin Gordon, Andrew Gyorgy, P.P. Hill, H.C. Hinton, Ching-Yao Hsieh, J.W. Kendrick, H.L. LeBlanc, R.K. Lewis, F.H. Michael, J.A. Morgan, Jr., J.N. Mosél, Benjamin Nimer, Vladimir Petrov, J.W. Robb, H.M. Sachar, B.M. Sapin, R.P. Sharkey, Chung-wen Shih, Gaston Sigur, Henry Solomon, George Stambuk, C.T. Stewart, Jr., R.B. Thompson, Richard Thornton, Helen Yakobson

Adjunct Professor T.F. Carroll

Associate Professors R.M. Dunn, Jr., G.C. Eads, C.F. Elliott, W.R. Johnson, Young Kim, P.F. Klarén, C.A. Linden, J.M. Logsdon, J.K. McDonald, C.A. Moser, Bernard Reich, S.J. Wayne, R.Y.C. Yin

Adjunct Associate Professors Donald Robinson, R.A. Young

Assistant Professors S.W. Burks, R.L. Cole, R.E. Darcy, Dana Fischer, S.A. Grant, K.J. Langran, D.L. Lee, H.R. Nau, L.P. Ribuffo, J.M. Starrels, G.C.Y. Wang, A.M. Yezer

COMMITTEES†

DEAN'S COUNCIL

S.W. Burks, R.M. Dunn, Jr., C.F. Elliott, Marvin Gordon, P.P. Hill, H.C. Hinton, W.R. Johnson, J.M. Logsdon, H.R. Nau, Vladimir Petrov, George Stambuk, Richard Thornton

COMMITTEE ON PROGRAMS AND CURRICULUM

R.E. Darcy, R.H. Davison, R.M. Dunn, Andrew Gyorgy, H.C. Hinton, Young Kim, J.M. Logsdon, Benjamin Nimer, Richard Thornton

COMMITTEE ON ADMISSION AND ADVANCED STANDING

S.W. Burks, Marvin Gordon, W.R. Johnson, C.A. Linden, J.M. Logsdon, A.M. Yezer

* The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the University Librarian are ex officio members of the Faculty of the School of Public and International Affairs.
† The Dean of the School is an ex officio member of all committees.

COMMITTEE ON EAST ASIAN STUDIES

W.R. Johnson (*Chairman*), H.C. Hinton, F.H. Michael, Chung-wen Shih, Gaston Sigur, Richard Thornton, R.Y.C. Yin

COMMITTEE ON RUSSIAN STUDIES

C.A. Linden (*Chairman*), C.F. Elliott, S.A. Grant, Andrew Gyorgy, G.A. Olkhovsky, Vladimir Petrov, R.B. Thompson, Richard Thornton, Helen Yakobson

COMMITTEE ON WORK-STUDY AND INTERNSHIP PROGRAMS

R.L. Cole, Dana Fischer, K.J. Langran, J.A. Morgan, Vladimir Petrov, J.M. Starrels

INTRODUCTION

With the establishment, in 1898, of the School of Comparative Jurisprudence and Diplomacy, the study of Government was first organized as a separate entity in the University. In 1928, this School was reorganized and broadened as the School of Government. During the next two decades, programs in business administration and public administration were added, and the emphasis gradually shifted from undergraduate to graduate study. The name was changed in 1960 to the School of Government, Business, and International Affairs to reflect more accurately the offerings of the School. A division of the School was effected in 1966, and two schools were established—the School of Government and Business Administration, a primarily professionally-oriented school, and the School of Public and International Affairs, a primarily policy-oriented school.

Programs of the School of Public and International Affairs are interdisciplinary, and emphasize governmental policy, both domestic and foreign.

Students in the freshman and sophomore years are registered in Columbian College of Arts and Sciences, the liberal arts college of the University, and are assigned special advisers from the School of Public and International Affairs to assist them in planning their programs.

ACADEMIC PROGRAMS

Programs available within the School of Public and International Affairs are undergraduate fields in Chinese Language and Literature, East Asian Studies (China and Japan), and Urban Affairs; undergraduate and graduate fields in International Affairs and Public Affairs; and graduate fields in Latin American Studies, Russian Studies, and Science, Technology, and Public Policy. Special programs in Soviet, Far Eastern, and East European studies are offered by the School's Institute for Sino-Soviet Studies.

OBJECTIVES

Four undergraduate programs of study—East Asian Studies, International Affairs, Public Affairs, and Urban Affairs—are aimed at preparing the student to

understand major contemporary issues in international affairs or in domest public affairs. The programs are designed not to produce narrow professiona specialists, but to foster a liberal education, interdisciplinary in nature a broader than a concentration in one of the conventional disciplines. In ea program there is double effort: to develop a background as broad and as de as possible in order to assist in the understanding and analysis of modern pro lems, and to give instruction in some useful tools of analysis. The program Chinese Language and Literature is closer to the traditional liberal arts patter emphasizing language and culture.

The graduate programs leading to the degree of Master of Arts are mor concentrated. The student is expected to develop a greater competence in area or a discipline, building on his undergraduate program in preparation f professional employment in government, in international organizations, in bus ness, or in private agencies concerned with public or international affairs.

REGULATIONS

Regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES a *stated on pages 21–34; other University regulations, on pages 44–52.*

ATTENDANCE

A student may not attend classes until registration is completed and fees di are paid.

The student is held responsible for all the work of the courses in which he registered, and all absences must be excused by the instructor in charge befo provision is made for him to make up the work missed.

A student suspended for any cause may not attend classes during the perio of suspension.

WITHDRAWAL

Withdrawal after the end of the fifth week of classes (fall or spring semester without academic penalty is permitted only in exceptional cases (see "Withdrawal," pages 47–48).

The Degree of Bachelor of Arts

THE SCHOOL OFFERS PROGRAMS leading to the degree of Bachelor of Arts in th fields of Chinese Language and Literature, East Asian Studies (China an Japan), International Affairs, Public Affairs, and Urban Affairs.

ENTRANCE REQUIREMENTS

The satisfactory completion of the *Chinese Language and Literature, East Asian Studies and International Affairs, Public Affairs,* or *Urban Affairs* curriculum in Columbian College of Arts and Sciences (see pages 81–83), or the equivalent, is required.

GENERAL REQUIREMENTS FOR THE DEGREE

The following requirements apply to both the standard 120-semester-hour and the special 90-semester-hour programs. See pages 169–70 for additional requirements for the 90-semester-hour program.

ACADEMIC WORK LOAD

Normal academic work load for the full-time student is 15 semester hours. A student with a strong academic record may take up to 18 semester hours with the approval of the Dean.

SCHOLARSHIP

In order to graduate, a student must have the following: (1) 120 semester hours (or 90 semester hours if the student qualifies for the special 90-semester-hour program) of passing grades (courses in Human Kinetics and Leisure Studies cannot be included in the required hours); and (2) grades of *A* or *B* in four 3-semester-hour courses in the major, to be taken in residence at George Washington University. The major includes the required second-group courses (101-200) and courses taken in the group options.

DEAN'S HONOR LIST

The name of every student who attains a 3.50 quality-point index* in his course work is placed on the Dean's Honor List for that semester. Appearance on the List will be limited to (1) full-time students registered for a minimum of 12 semester hours and (2) part-time students registered for a minimum of 12 semester hours over a period of two consecutive semesters, which may include a summer term.

ACADEMIC STANDING

A student who is not suspended or on probation is considered to be in good standing.

The following rules governing probation and suspension are applicable as stated to students enrolled for a full-time program (12 semester hours or more) during the fall or spring semester or the two summer sessions. For students taking less than 12 semester hours in any one semester or both summer sessions, these rules are applied on the basis of 12 or more hours taken during two or more semesters or summer sessions.

* See page 47 for explanation of the quality-point index.

PROBATION

A student who in one semester receives two grades of *F** in courses carrying 3 or more semester hours of credit each, or the equivalent, is placed on probation. A student on probation who receives one grade of *F** in such a course will be continued on probation for a second semester. A student on probation taking 12 or more semester hours whose grades are all *C* or better is removed from probation.

SUSPENSION

A student who in one semester receives grades of *F** in three courses carrying 3 or more semester hours of credit each, or the equivalent, is suspended. A student on probation who receives two or more grades of *F** in such courses is suspended. A student who receives one or more grades of *F** in such courses in a second semester on probation is suspended.

A student who is suspended for poor scholarship may apply for readmission after the lapse of either the fall or spring semester. To be considered for readmission, he must pass prescribed tests and submit evidence to the Dean's Council that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student readmitted after suspension is on probation. In no case will the probationary period after readmission exceed 24 hours of study. A student suspended twice for poor scholarship will not be readmitted.

INCOMPLETE/AUTHORIZED WITHDRAWAL

Conditions under which the grades of *I* (Incomplete) or *W* (Authorized Withdrawal) may be assigned are described on page 46.

Removing an Incomplete.—The grade of *I* must be removed no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of *I* is assigned. An "Incomplete" that is not removed within this period is automatically changed to an *F*. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the Dean, or the appropriate committee, for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere.

RESIDENCE

A minimum of 30 semester hours, including at least 12 hours in the major field, must be completed while registered in the School of Public and International Affairs. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in the School of Public and International Affairs.

---

* In determining whether a student is placed on probation or suspension, two grades of *D* are equated with one grade of *F*. Thus, for example, a student who receives one grade of *F* and two grades of *D* is placed on probation, and a student who receives two grades of *F* and two grades of *D* is suspended.

USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the Dean. The Dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the Dean.

STUDY ABROAD

Students wishing to study abroad must consult with their advisers and the Dean, because arrangements must be made on an individual basis. Students should receive the Dean's approval, in advance, for their plan of study abroad if they plan to have the credits earned abroad apply to the degree program they are registered for in this School. A catalogue or other description of the foreign institution or study program should be presented for consideration together with detailed descriptions of the courses to be taken. Students of international affairs are encouraged to travel and study abroad.

CREDIT/NO CREDIT OPTION

A student in the School of Public and International Affairs who has a cumulative quality-point index* of 2.50 or better may, with the approval of his adviser and the Dean, take one course each semester and receive a grade of *CR*, Credit, or *NC*, No Credit, which will be recorded on the student's transcript but will not be reflected in his cumulative grade average. A student must sign up for such an option at registration. Under no circumstances may a student change from credit/no credit status to graded status, or vice versa, after the end of registration. Courses in the student's major (except those in which the grade of *CR* or *NC* is normally assigned) may not be taken on a credit/no credit basis. A transfer student may not elect to take a course on a credit/no credit basis until the second semester of his enrollment in the University. Students in the School of Public and International Affairs may take no more than six courses in which the grade of *CR* or *NC* is assigned, including those in which the grade of *CR* or *NC* is normally given and those taken in any other college, school, or division of the University prior to transferring to the School of Public and International Affairs.

CORRESPONDENCE AND HOME-STUDY COURSES

Credit for correspondence or home-study courses is not acceptable and cannot be applied toward a degree.

ADDITIONAL REQUIREMENTS FOR THE 90-SEMESTER-HOUR PROGRAM

Exceptional students may, when registered as freshmen or sophomores in Columbian College of Arts and Sciences, petition the Dean of the School of Public and International Affairs for admission to a special 90-semester-hour degree program in the School of Public and International Affairs, supplying supporting evidence in the form of achievement test scores, College-Level Ex-

* See page 47 for explanation of the quality-point index.

amination Placement (CLEP) scores, and grades earned at George Washington University or any other institution. The Dean, in consultation with the Dean's Council, will determine eligibility for admission to the program, which will be effective upon the student's entering the School of Public and International Affairs at the beginning of the junior year.

In addition to the general requirements (see pages 167–69) and the curriculum requirements (see pages 170–73), a student in the 90-semester-hour program must fulfill the following requirements.

1. He must receive grades of *A* in 50 per cent of his total course work (in 45 of the 90 semester hours), and also in 50 per cent of the courses required in his major.

2. He must take at least 60 semester hours in courses beyond the first-group level (numbered above 100).

3. The 90 semester hours of credit must be earned in actual course work, i.e., credit through Advanced Placement, special examinations, etc., may not be counted in the 90 semester hours required for graduation.

Students who qualify for admission to the 90-semester-hour program are encouraged to begin taking second-group courses (numbered 101-200) as soon as they are qualified to do so, and should seek to obtain a waiver of course prerequisites in those disciplines in which they have a strong background.

CURRICULUM REQUIREMENTS

To be recommended by the faculty for graduation, candidates are required to complete, in addition to the appropriate freshman and sophomore work (see pages 81–83), a minimum of 60 semester hours during the junior and senior years, as set forth in one of the following curricula.

EARNING CREDIT OR WAIVING REQUIREMENTS BY EXAMINATION

For information on earning credit or waiving curriculum requirements, see Columbian College of Arts and Sciences, pages 78–79.

MAJOR FIELDS OF STUDY

Requirements for the five major fields of study leading to the degree of Bachelor of Arts are listed below. Students should consult the appropriate department in the "Courses of Instruction" section of this catalogue for complete course descriptions.

CHINESE LANGUAGE AND LITERATURE

Prerequisite.— A minimum of 60 semester hours in Columbian College (see page 81), or the equivalent from another accredited institution.

Requirements for the Major.—Chin 11–12, 109–10, and 163–64; plus 12 additional semester hours of second-group Chinese literature courses. The student is required to pass a major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be examined includes an active command of modern Chinese language and a general knowledge of Chinese literature and culture. A proseminar (199–200) assists the student in preparation for the major examination.

Students in the Chinese Language and Literature program may avail themselves of a junior year abroad, as in the East Asian Studies program, China focus (see page 171).

EAST ASIAN STUDIES (China and Japan)

The major in East Asian Studies is designed to introduce the student to a non-Western culture and to provide an understanding of the history, politics, and economy of modern China or Japan. The major is interdepartmental and is recommended for students who wish a comprehensive study of one of the world's major civilizations and for those who contemplate graduate study in Chinese, Japanese, or Far Eastern affairs.

A junior year abroad is available in this program of study for those interested in China. Students should contact the Chairman of the Department of East Asian Languages and Literatures.

Prerequisite.—The East Asian Studies curriculum, page 82, including Chin 5–6 or Jap 21–22.

Requirements for the Major.—(1) Chin II (China focus) or minimum of 3 additional hours of Japanese (Japan focus), and 163 or 164; (2) Econ 169 (China focus) or 170 (Japan focus); (3) 3 semester hours selected from Geog 125, 126, 127, 132, 146, or 161; (4) 9 hours selected from Hist 138, 187, 188, 189, 195, 196 (either Hist 187 or 196, but not both, may be selected); selection covering both pre-modern and modern periods encouraged; (5) 3 hours selected from PSc 101, 193, 194; (6) 9 semester hours of course work in Economics, History, or Political Science *not related* to China or Japan, to be selected in consultation with the adviser and approved by him; 6 semester hours in research and writing seminar related to China (China focus) or Japan (Japan focus) and taken in discipline of concentration.

INTERNATIONAL AFFAIRS

The major in International Affairs enables the student to specialize in international political relations, international economics, international communications, or regional studies.

Prerequisite.—The International Affairs curriculum, page 82.

Requirements for the Major.—(1) Econ 181–82; (2) 6 semester hours of a third year of foreign language (may be a literature course taught in the language); (3) 3 semester hours selected from Geog 125, 126, 127, 132, 135, 146, or 161; (4) Hist 150 or 157, and 182; (5) PSc 171, and 172 or 181; (6) 15 semester hours from one of the Group Options listed below:

Group I. International Politics—courses concerned with theory and practice in international affairs, forces shaping the world scene, and American foreign policy, selected from Geog 125, 126, 127, 139, 146 (if not elected to satisfy the Geography and Regional Science requirements); Hist 138, 139–40, 149, 183; PSc 107, 111, 112, 117–18, 160, 167, 179, 189 (PSc 172 or 181 may be elected if not taken to satisfy the major requirement).

Group II. International Economics—courses concerned with the world economy and American policy and practice in international trade and finance, selected from BAd 176, 178; Econ 101, 102, 104, 121, 122, 134, 147; Geog 125, 126, 127, 135; Stat 111, 112, 122.

Group III. International Communications—courses concerned with the study of international information programs, public opinion, psychological warfare, cultural relations, and public relations, selected from Anth 150, 153, 157, 161, 162; Geog 106, 125; Jour 145, 146; PSc 146, 167; Psyc 115, 151, 156; Soc 144.

Group IV. Regional Study—a concentration in one of the following areas: (1) Africa—courses selected from Anth 178, 179, PSc 189, 190, 192; (2) Europe—courses selected from Econ 147, Hist 131–32, 141–42, 147, 149, 151–52, 158, PSc 111, 112, 117–18; (3) Far East—courses selected from Anth 173, 174, 175, Chin 163–64, Econ 169, Geog 164, Hist 138, 187, 188, 195–96, PSc 101, 193, 194; (4) Latin America—courses selected from Anth 170, 172, 185, Econ 185, Geog 161, Hist 163–64, 165, 166, PSc 177, 178, interdisciplinary seminar 287 offered by six departments participating in the Latin American Studies program; (5) Middle East—courses selected from Anth 177, Hist 149, 158, 193, 194, PSc 179, 180, 191, 192, Rel 161; or (6) Soviet Union and Eastern Europe—courses selected from Econ 133, 134, Hist 138, 143, 145, 146, 188, PSc 112 or 115, 160, 163, Slav 161–62, 165, 166, 193–94.

PUBLIC AFFAIRS

The major in Public Affairs deals with domestic government and policy.

Prerequisite.—The Public Affairs curriculum, pages 82–83.

Requirements for the Major.—(1) Econ 101, 161, 162; (2) Hist 175–76; (3) PSc 121, or 122, 126 or 151, 145; (4) 12 semester hours from one of the Group Options listed below:

Group I. Economics—courses selected from Econ 102, 104, 121, 122, 123, 136, 142, 165, 181–82.

Group II. Politics—courses selected from PSc 103, 104, 108, 111, 119–20, 125, 126 (if not taken as a major requirement), 146, 167, 199.

Group III. Urban Affairs—courses selected from BAd 174; Econ 157; Geog 140, 141, 142; Hum 196; PSc 103, 104; Soc 126; U&RP 153.

URBAN AFFAIRS

The major in Urban Affairs introduces students to the problems and issues of urban America and develops some of the practical skills necessary for dealing with actual decision-making situations in urban-related occupations. Emphasis is on urban public policy—the forces and processes that shape it and its adequacy in terms of current and anticipated needs.

The student may specialize either in the political and administrative aspects of the policy-making process, or in the analysis and evaluation of specific policy areas. An adviser works closely with each student to develop a program suited to his personal interests and objectives. In his senior year, the student serves an apprenticeship in an urban-related agency or research organization and also attends a weekly seminar in which the work experience is related to a body of academic literature.

Prerequisite.—The Urban Affairs curriculum, page 83.

Requirements for the Major.—(1) Introduction to Urban Affairs: Econ 157 and one additional 3-semester-hour course in Economics, Geog 140, PSc 104, 151, 196, Hist 186; plus two courses selected from Hum 40, 51–52, Soc 126 (waiver of Soc 1 requires permission of the instructor); (2) Urban Research Methods: Stat 5 and PSc 105, plus one course selected from Stat 97, 105, 113, 117, 118, 123, Acct 1,2; (3) Specialized Topics: three courses selected from BAd 174, Econ 136, 162, 165, 243, Geog 141, 142, PAd 246, 249, 250, Soc. 147, 223, U&RP 153, 20 (special arrangements necessary to take graduate courses in Public Administration

or Urban and Regional Planning); (4) Senior Apprenticeship and Seminar: PSc 183–84 and 185–86 (the grade of *CR* (Credit) or *NC* (No Credit) will be given for PSc 185–86). A student may elect to fulfill the apprenticeship requirement in a paid position in lieu of registering for PSc 185–86; however, the student must substitute 6 semester hours of elective course work.

Because they participate in the senior apprenticeship and seminar, majors in Urban Affairs may not select courses in the Service-Learning Program.

The Degree of Master of Arts

THIS SCHOOL OFFERS PROGRAMS leading to the degree of Master of Arts in the major fields of International Affairs; Latin American Studies; Public Affairs; Russian Studies; and Science, Technology, and Public Policy.

ADMISSION REQUIREMENTS

Application forms are available from the Graduate Admissions Office, School of Public and International Affairs, George Washington University, Washington, D.C. 20052.

A Bachelor's degree from an accredited college or university, with a *B* average or better, or the equivalent, in the relevant undergraduate major, is normally required. If there is evidence of special promise, such as high GRE scores, an applicant whose academic record falls short of *B* will be given serious consideration. Scores on the Aptitude Test of the Graduate Record Examinations as well as letters of recommendation are required.

In International Affairs.—The applicant's undergraduate program should include background courses corresponding to the interdepartmental undergraduate major in International Affairs at this University (see pages 171–72), or some other relevant social science program. In the case of major deficiencies in the social sciences or international relations, additional course work may be specified beyond the minimum requirements for the Master's degree. The student's particular responsibilities will be indicated in his letter of admission to the program and in the course of subsequent consultation with an assigned faculty adviser.

In Latin American Studies.—The applicant's undergraduate program should include background courses corresponding to an undergraduate major in Latin American Studies at this University (see page 367) or equivalent. Majors in other fields may be considered for admission provided their undergraduate course work includes Spanish or Portuguese and sufficient course work in three of the following six areas: Anthropology, Economics, Geography and Regional Science, Hispanic Literature, History, and Political Science.

In Public Affairs.—An undergraduate major in Public Affairs, Economics, History, or Political Science, depending upon the field of specialization in the Master's program, is required. Students entering the program are assumed to have had some college-level course work in American government and politics, American history, and economic theory. To the extent that a student lacks

such a background, he must, in consultation with his adviser, undertake the appropriate remedial course work, including some courses which may be taken for graduate credit.

In Russian Studies.—An undergraduate major in a pertinent field is required. The undergraduate program should have included the following courses, or equivalent: Hist 145, 146; P Sc 112; Slav 1–2 and 3–4, or 5–6.

In Science, Technology, and Public Policy.—Undergraduate majors in a social, life, or physical science, or in engineering are eligible for admission, although those lacking adequate preparation in relevant social sciences, particularly economics, may be required to take additional courses; such requirements will be indicated in the letter of admission to the program.

READMISSION

A graduate student who has not maintained continuous registration and has not registered for one or more semesters must file an application for readmission the semester before he wishes to enroll. Applications for readmission are reviewed by the Dean and the Committee on Admission.

GENERAL REQUIREMENTS

There are two options available in all fields leading to the Master of Arts degree except Russian Studies. One requires a minimum of 24 semester hours of approved graduate course work plus the successful completion of a thesis; the student must register for 6 semester hours of *Thesis Research* (299–300). The second option requires a minimum of 36 semester hours of graduate course work and does not include a thesis. In the field of Russian Studies, only the first of these two options, including the thesis, is permitted. The course work for both options is taken in preparation for the Master's Comprehensive Examination.

Candidates for the degree of Master of Arts are required to submit an adviser-approved "Program of Studies" (comprehensive fields, supporting course work, tool requirement, etc.) to the Office of the Dean by the end of the first semester in residence.

Master's degrees are awarded by vote of the Faculty after the student has completed the required course work and an acceptable thesis (if one is elected), has satisfied the foreign language or tool requirement, and has passed the Master's Comprehensive Examination. An applicant whose background does not include the necessary courses or equivalent work experience must take a program longer than the minimum hours required.

Under special circumstances second-group courses (numbered 101–200) may be counted toward the Master's degree when registration for graduate credit has been approved at the beginning of the course by the curriculum adviser, the instructor, and the Dean. The student who takes an undergraduate course for graduate credit is expected, by arrangement with the instructor, to do work at the graduate level in addition to the regular work of the course. Normally, no more than 6 semester hours of second-group courses may be taken for graduate credit in the 30-semester-hour program, and no more than 9 semester hours may be taken for graduate credit in the 36-semester-hour program. No

work counted toward a Bachelor's degree may also be counted toward a Master's degree.

All work for a Master's degree must be completed in five years, unless an extension of time is granted by the Dean.

No credit is granted for work done *in absentia* or without formal instruction, except for the thesis, which may be completed *in absentia* with the permission of the curriculum adviser and the Dean. No more than 6 semester hours of graduate credit may be transferred from other accredited institutions or another division of the University, and these may be accepted only under limited conditions of time, grades, and relevance to the student's program.

A student who expects to continue his studies for the degree of Doctor of Philosophy in the field of International Relations after receiving the Master's degree in the field of International Affairs is strongly advised to plan from the beginning so that work for the lower degree will fit into a subsequent doctoral program in the Graduate School of Arts and Sciences (see pages 93–97, 100–102).

TOOL REQUIREMENTS

In most programs of study a candidate for the degree of Master of Arts must show that he has a reading knowledge (certified by the appropriate language department) of at least one modern foreign language, to be approved by the Dean. A Master's degree candidate whose native language is not English may not select his native language to meet the tool requirement; he may select English to fulfill the requirement with the approval of his adviser and the Dean. The examination is administered by the Department of English.

Candidates in the field of Public Affairs and in the field of Science, Technology, and Public Policy may substitute statistics for a foreign language. This requirement may be met by demonstration of proficiency at the level of Stat 105, 112, or 197.

Candidates in the field of International Affairs may petition the Dean to substitute statistics for a foreign language. The primary basis for approving such petitions will be the relevance of the statistical skills to the student's thesis research.

The language or tool examination should normally be taken before the student has completed the first 15 hours of his work. No student may take the examination more than three times.

Courses taken to fulfill the tool requirement are not counted in the semester-hour requirement for a Master's degree.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to any course examinations, the candidate must pass a written Master's Comprehensive Examination. Examinations are scheduled twice a year (usually in November and April), and should be taken during the last semester of course registration or shortly after the completion of the prescribed course work. If there is a lapse of time between completion of course work and the examination, the student must maintain "continuous registration" during this period. The candidate must consult with his adviser, well in advance, as to the date of his examination and the definition of the subject-matter fields which this examination is to cover. An oral examination on his thesis or major report may also be required.

SCHOLARSHIP

Grades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; and *CR*, Credit.

An average of *B* or better is required for the Master's degree. The grade of *C* is not considered as failing but must be counter-balanced by a grade of *A* in a graduate course of equal status.

A Master's candidate who receives a grade of *F* is required to present cause for consideration by the Dean's Council as to why he should be allowed to continue his studies.

Whenever a grade has not been assigned, the symbol *I* (Incomplete) or the symbol *W* (Authorized Withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. Except for Thesis Research courses, an "Incomplete" cannot be made up after the lapse of one calendar year. An "Incomplete" which is not removed by the end of one calendar year remains as a grade of *I* on the student's record. An "Incomplete" cannot be removed by reregistering for the course.

THE THESIS

The thesis subject should be selected as early as possible so as to permit effective integration with the course work.

The subject must be approved by the student's adviser and the member of the Faculty under whom the thesis is to be written. The thesis in its final form must have the approval of the thesis director *and one other reader*, and two copies must be presented to the Dean by the student no later than the date announced in the Calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the period of registration, to the advice and direction of the thesis director and the other reader. In case a thesis is unfinished, an additional calendar year may be granted without further tuition payment. The student must, however, maintain continuous registration (see page 49) during this period. If the preparation of the thesis extends beyond the additional calendar year, *the student must register for the entire 6 hours of thesis again* and pay tuition as for a repeated course.

FIELDS OF STUDY

Specific requirements for each of the five fields of study leading to the degree of Master of Arts are listed below. For prerequisites, see "Admission Requirements," pages 173–74.

INTERNATIONAL AFFAIRS

The interdisciplinary program leading to the degree of Master of Arts in the field of International Affairs provides the student with a wide choice of fields within three broad areas of study: general, supplemental or special, and regional. Graduate courses in Anthropology, Business Administration, Economics, Geography and Regional Science, History, Political Science, Psychology, and Sociology relate to these fields, which are listed below:

General Fields of Study.—International Politics, Comparative Government and Politics, Modern Political Theory (including Socialist and Communist Theory), and International Economics.

Supplementary or Special Fields.—International Law; International Organization and Administration; International Economic Development; International Communications; International and Comparative Aspects of Communism; U.S. Diplomatic History; U.S. Foreign Policy; and Science, Technology, and Public Policy.

Regional Fields.—Modern history, or government and politics, or economic history and problems of one of the following: Western Europe, Eastern Europe, the Soviet Union, Latin America, the Middle East, Africa, South and Southeast Asia, and China. Within each geographical area there are normally three fields of study available.

Each degree candidate must select at least one "general" field. His fields should also represent at least two disciplines. Beyond these limits, the student is free to select any of the fields indicated above as long as they comprise a coherent program. Candidates will be examined on their selected fields of study in the Master's Comprehensive Examination (see page 175).

Candidates who elect to write a thesis must choose *three* of the listed fields and take, in addition to the thesis, a minimum of 24 semester hours of graduate course work in at least two departments, with no more than 15 hours in any one department.

Candidates electing a program without a thesis must choose *four* fields and may take no more than 21 of their required 36 semester hours in one department. They must also include in their program at least two research seminars (6 semester hours) requiring the preparation of substantial research papers.

Courses should be chosen, in consultation with the adviser, with a view to their relevance to the selected fields. It should be understood, however, that course work constitutes only partial preparation for the Master's Comprehensive Examination. Each student is also expected to pursue a program of additional reading in each of his selected fields, in accordance with the advice of the faculty member responsible for instruction in that field.

LATIN AMERICAN STUDIES

The program leading to the degree of Master of Arts in the field of Latin American Studies is designed to provide the student with an appropriate area background in three or four of the following fields: Anthropology, Economics, Geography and Regional Science, Hispanic Literatures, History, and Political Science.

All degree candidates must complete 12 semester hours of graduate work, including the interdisciplinary seminar (287), in a major field selected from those listed above, and 6 semester hours in each of two minor fields selected from those listed above. If a student elects not to write a thesis, he must take 6 semester hours in a third minor field selected from those listed above, or from the fields of urban and regional planning, economic development, or population studies. He must further complete an additional 6 semester hours in any of his fields, major or minor. The tool requirement (see page 175) must be satisfied by demonstration of proficiency in Spanish or Portuguese, or in English if the student's native language is Spanish or Portuguese. The Master's

Comprehensive Examination (see page 175) will cover all the student's selected fields.

PUBLIC AFFAIRS

The program leading to the degree of Master of Arts in the field of Public Affairs allows the student to specialize in either domestic economics or domestic politics. The student may select his courses in consultation with an adviser to emphasize either political science, economics, or American history, provided (1) he elects no more than 15 hours of courses in one department under the 24-hour plus a thesis program, or (2) he elects no more than 21 hours in one department under the 36-hour program without a thesis. Course work may include Economics (public finance, monetary theory and policy, labor economics, industrial organization, natural resources and environmental economics, regional and urban economics, economic policy); History (U.S. political history, U.S. economic history, recent U.S. history); Political Science (domestic politics and government, congress and the presidency, U.S. constitutional law and politics, state and urban politics, political science research methods, and science, technology, and public policy).

RUSSIAN STUDIES

The program leading to the degree of Master of Arts in the field of Russian Studies requires the following courses: Econ 133; Hist 237, 245; PSc 224, 229, 269; Slav 161-62 or 165 and 166; and *Thesis Research* (299-300). The thesis, which is required of all students in this field, should be interdisciplinary in approach. With the exception of the thesis, students may, with the approval of the adviser, substitute alternate courses for those in the required program.

SCIENCE, TECHNOLOGY, AND PUBLIC POLICY

The program leading to the degree of Master of Arts in the field of Science, Technology, and Public Policy is flexible and is carefully planned and conducted in consultation with an adviser. All degree candidates are required to take 12 semester hours in the core field of science, technology, and public policy, which includes course work both in science policy and in policy analysis. A second field must be chosen from one currently offered in the international affairs or public affairs programs of the School. Students who elect to write a thesis must select one additional field, and those who elect not to write a thesis must select two additional fields. The third (and fourth) fields may also be chosen from those currently offered in international affairs or public affairs or may be interdisciplinary, developed in consultation with the adviser and drawing upon the total resources of the University in order to focus on a particular policy issue or area. Such a special field must be approved by the student's adviser and the Dean.

Combined Master of Arts and Juris Doctor Degree Program

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS cooperates with the National Law Center in offering a program leading to the combined degrees of Master of Arts and Juris Doctor. A student must be accepted for admission by both the School of Public and International Affairs and the National Law Center. Applications should be made separately, but at the same time. Both the School and the Center should be notified that the student is interested in the combined program. The student will be admitted to the School of Public and International Affairs for the academic year following the first year of study at the National Law Center, since the National Law Center stipulates that the first year of course work for the Juris Doctor degree must be taken as a unit.

The Master of Arts degree program normally consists of the 30-semester-hour program which includes a thesis. The student selects a major offered by the School and fulfills all of the requirements for the Master of Arts degree as well as fulfilling the requirements for the Juris Doctor degree. Up to 6 semester hours of credit for course work completed as part of the Juris Doctor curriculum and related to the student's Master's degree program may be approved for transfer toward the Master of Arts degree. (Some of the course work required for the Master of Arts degree program may be applicable toward the Juris Doctor degree requirements.) Students will be registered in both the School of Public and International Affairs and the National Law Center and must maintain this concurrent registration until all degree requirements have been completed. All work for this combined degree program must be completed in five years, unless an extension of time is granted by the Dean.

Institute for Sino-Soviet Studies

THE INSTITUTE FOR SINO-SOVIET STUDIES provides a program of specialized graduate study and research within the School of Public and International Affairs. Courses of the Institute are drawn from a variety of academic areas and thus provide an interdisciplinary approach to the study of the Soviet Union, Eastern Europe, and East Asia, and of the Communist movement within and among the countries of these areas. Faculty members conduct seminars and reading courses in the disciplines of economics, geography, history, language and literature, law, political science, and psychology.

Students who are preparing for the degree of Master of Arts in the field of International Affairs in the School of Public and International Affairs, or for the degree of Master of Arts in the field of Economics, History, or Political Science in the Graduate School of Arts and Sciences, with specialization in Sino-Soviet Studies, may take one-half of their course work from the Institute's program.

Students working toward the degree of Doctor of Philosophy in International Relations with special emphasis on the Sino-Soviet area are expected to com-

bine work in the Institute with work in the fields of economics, history, an political science. Doctoral candidates in the field of Political Science will tak their Sino-Soviet work in the form of appropriate sub-fields of the major an minor fields. Doctoral candidates in the field of History are expected to take a least two of the four fields of the degree in the history of the countries of the specialization. All work leading to the degree of Doctor of Philosophy is unde the general supervision of the Graduate School of Arts and Sciences and Con sultative Committees designated by that School which direct the work of each graduate student upon admission to degree candidacy. A faculty member of th Institute will serve as adviser to the candidate. The candidate's committee will b formed from members of his disciplinary department. A candidate for such degree should assume that his committee will require the substitution of reading examination in Chinese or Russian for one of the two Western lan guages normally required for the degree.

RESEARCH

Research work is integrated with the teaching program. Members of the re search program belong to different disciplines and include not only faculty bu also selected graduate students. Research monographs are being published by the Institute.

A special brochure describing in more detail the work of the Institute is available upon request.

INTERUNIVERSITY RESEARCH COLLOQUIA

Scholars from George Washington University, American University, George town University, Howard University, the School of Advanced International Studies of Johns Hopkins University, and the University of Maryland conduct two interuniversity research colloquia. The Colloquium on East Asia is unde the chairmanship of Professor Franz Michael; the Colloquium on Russia an Eastern Europe is under the chairmanship of Professor Andrew Gyorgy. Re search in progress by members of the colloquia and plans for future researc are discussed at weekly meetings. Advanced graduate students can be admitte on approval of the chairman concerned. They receive 3 semester hours o academic credit for each semester of participation, which includes preparation of written work of their own.

War College Progra

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS offers an off-campus pro gram at the National War College leading to the degree of Master of Scienc in International Affairs. Admission is limited to selected members of th faculty and student bodies of the War College.

The program of study is complementary to that portion of the War College curriculum pertaining especially to international relations and foreign poli

DIVISION OF UNIVERSITY STUDENTS

Dean J.G. Allee, Jr.
Assistant Dean B.K. Netland

DEAN'S COUNCIL*

J.G. Boswell, A.H. Desmond, Hewitt Kenyon, R.W. Kenny

INTRODUCTION

THE DIVISION OF UNIVERSITY STUDENTS was established in 1930 to make the regular course offerings of the University more generally available to members of this metropolitan community and to others who are not at the time candidates for degrees in this University. In this Division are registered students who wish to undertake university courses for credit or as auditors. University Students, often employed in government or industry, may be taking courses to increase their vocational fitness or to inform themselves on new developments in the arts and sciences. They may be taking courses as a matter of personal interest for cultural enrichment. Such students may be candidates for higher degrees in other institutions, sent here for special work as part of a graduate program. They may be undergraduates, matriculated in other colleges, taking summer sessions courses only or courses for transfer during the regular academic year with the approval of their own institution. They may be students from institutions outside the Washington metropolitan area enrolling in an appropriate "Washington Semester" program. To serve members of such groups and others not enrolled in degree-granting branches of the University is the function of the Division of University Students.

The privilege of attending George Washington University as a nondegree student is granted on the basis of maturity and proper preparation. Because no degree at George Washington University is involved, there can be no meaningful advisory system in the Division. However, students are invited to seek advice from academic departments. University students are urged to apply to the Office of Admissions for transfer to degree-granting branches whenever such action is appropriate.

All courses except those restricted to medical and law students and those limited to specific degree candidates are open to students in the Division of University Students. Students wishing to take Engineering and Applied Science courses should consult the *School of Engineering and Applied Science* Catalogue.

* The Vice President for Academic Affairs, the Dean and the Assistant Dean of the Division are ex officio members of the Council.

Registration in a given course may be denied students in this Division when space is needed for degree candidates.

An applicant who has been denied admission to any degree-granting branch of the University will not be considered for admission to the Division of University Students for the semester for which the applicant was denied, except upon written recommendation of the dean of the college or school that denied the applicant. However, an applicant who has been denied may be considered in subsequent semesters.

Nondegree students who have not completed a Bachelor's degree may not enroll in graduate courses offered by the School of Government and Business Administration.

An applicant who has been suspended from any educational institution for poor scholarship will not be considered for admission to the Division of University Students for one calendar year after the effective date of the suspension.

ENTRANCE REQUIREMENTS*

Good character and an academic background appropriate for the program of studies contemplated are required.

A person not working for a degree at this University will be considered for admission to the Division of University Students to take courses for which he has adequate preparation, as determined by the departments concerned.

Although the deadline for applications for admission to the Division of University Students is the Friday before the first day of registration (see pages 5, 6), applicants are urged to apply earlier because no special exceptions can be made to permit registration for credit after the last day for adding classes (see page 183) even though the requiring of credentials, records, and test scores may delay the action on an application for admission. Insofar as time for full processing permits, applications submitted after the deadline may be considered. Subject to the permission of the department concerned, the deadlines for late registration, adding, dropping, and withdrawal do not apply to auditors.

Scholastic records are required of

1. An applicant who has graduated from high school within the previous two calendar years. Such an applicant must pass designated aptitude tests and meet the following requirements, which are the same as those for admission to Columbian College of Arts and Sciences and the School of Government and Business Administration.

   a) An acceptable certificate of graduation from an accredited secondary school, showing at least fifteen units† which must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and two years of college preparatory mathematics.

---

* Foreign students, see pages 26-27.

† A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

b) The principal's statement that the applicant is prepared to undertake college work.
c) College Entrance Examination Board scores on the Scholastic Aptitude Test and the English Composition Achievement Test.

2. An applicant who has been subject to any form of academic or disciplinary action at any college or university within the previous calendar year.
3. High school students who are applying for the Secondary School Honors Program (see page 185).
4. An applicant who has not completed high school or the equivalent. Such an applicant may be required to take assigned aptitude tests at the University Counseling Center.

Scholastic records may be required of

1. An applicant who has attended any college or university during the previous calendar year.
2. A former student of this University who was on probation or suspended and, since then, has attended another college or university.
3. An applicant who has *ever* been subject to academic or disciplinary action. When scholastic records are required, a student may be admitted for one semester or summer term only, pending receipt of records and under provisions stated by the Office of Admission.

REGULATIONS

Regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are stated on pages 21–34; other University regulations, on pages 44–52.*

Prospective and registered students are urged to acquaint themselves with the regulations concerning "Attendance" (see page 45) and "Withdrawal" (see pages 47–48).

The following specifically applies to all students in the Division of University Students:

Last day to add a class for credit—end of first week of classes.

Last day to drop a class for credit or withdraw from the University—end of the ninth week of classes. (See Calendar for beginning date of classes, pages 5, 6).

Equivalent amounts of time apply to the summer sessions.

ACADEMIC WORK LOAD

The normal academic work load is not more than 10 hours for a student employed more than 20 hours a week and not more than 17 hours for a full-time student. (Hours for courses graded *I*, "Incomplete," will be included in subsequent academic work load.) Exceptions to those limits must be approved by the Dean.

SCHOLARSHIP

A student who fails to maintain the scholarship requirements of this Division may be dismissed from the University.

Normally, any course may be repeated for credit. All grades received in the Division of University Students remain on the record, and scholarship requirements are based on the total record. A course taken for audit may not be repeated for credit (see page 48).

GRADES

Undergraduate.—*A*, Excellent; *B*, Good; *C*, Satisfactory; *D*, Low Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal.

Graduate.—For graduate work, grades are indicated as *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal.

The "credit/no credit" option, which permits students to take courses in which they receive the grade of either "Credit" or "No Credit," is not available to students registered in the Division of University Students.

INCOMPLETE/AUTHORIZED WITHDRAWAL

Conditions under which the grades of *I* (Incomplete) and *W* (Authorized Withdrawal) may be assigned are described on page 46.

Removing an Incomplete.—Although the grade of *I may* remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work (usually the final examination or a required paper) must be made up. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere. An "Incomplete" cannot be made up after the lapse of one calendar year except by written permission of the Dean's Council. An "Incomplete" which is not removed within one calendar year remains as a grade of *I* on the student's record.

PROBATION AND SUSPENSION

A student taking courses for undergraduate credit is subject to the same "Probation" and "Suspension" regulations as those of Columbian College of Arts and Sciences (page 74).

A student taking any courses for graduate credit must maintain a cumulative quality-point index in these courses of 3.00 or the equivalent. If the cumulative (graduate) index falls below 3.00, the student will be placed on probation. If the cumulative (graduate) index falls to 2.25 or below, the student will be suspended.

A student taking (or having taken) some courses for undergraduate credit and taking (or having taken) some courses for graduate credit will be considered on probation if the standards stated above are not maintained in either undergraduate or graduate work. Similarly a student suspended from undergraduate or graduate work is suspended from all work in the Division.

A suspended student will not be permitted to audit a course in the Division during the period of suspension.

CHANGES IN PROGRAM OF STUDIES

Changes within the Division of University Students.—A student may not change or drop courses (see "Withdrawal," pages 47–48) or change his status to that of auditor except with the approval of the Dean.

Change from one section to another of the same course may be made with the approval of the Dean and the department concerned.

Transfer within the University.—Transfer to or from the Division of University Students may be made only with the approval of the deans concerned.

Application for transfer to degree candidacy will be considered only after the completion of at least one semester in the Division of University Students or upon request from the college or school to which the student is seeking admission.

The student wishing to transfer to degree candidacy must meet the conditions of the college or school to which he is applying. It is the responsibility of the student to consult the relevant degree-granting college or school concerning all conditions to be met and the amount of work transferrable.

SECONDARY SCHOOL HONORS PROGRAM

The outstanding secondary school student in the Washington metropolitan area who wishes to enrich his academic background and participate in stimulating college work is encouraged to seek admission to the George Washington University's Secondary School Honors Program. The Honors Student is enrolled in regular college courses of his own choosing appropriate to his level of study, his background, and his aptitude as determined through consultation with his high school counselors and advisers at the University.

Credit earned in the Program is applicable toward a degree at George Washington University should the student later matriculate here. The transfer of credit elsewhere depends upon the policies of the individual schools to which the student might later apply.

Admission to the Honors Program is highly competitive. Normally, only 15 students a semester will be admitted to this Program, and each student will receive a scholarship totaling 50 per cent of his tuition (excluding laboratory and University Center fees). Admission is for one semester only, but students doing well will be given preference for continuation and may be readmitted for a second semester. Criteria for admission are based on a transcript of the student's grades to date, available test scores, evidence of emotional and intellectual maturity, and the results of the interview with the Director.

Application forms and further information may be obtained from B. K. Netland, Director of the Secondary School Honors Program, Division of University Students, George Washington University, Washington, D.C. 20052. No applications will be considered after the Friday before the final day of registration for the semester concerned. For application for the summer session see the *Summer Sessions Catalogue*.

DIVISION OF EXPERIMENTAL PROGRAMS

Director C.C. Mondale

THE UNIVERSITY is committed to the continuous development of new curricular options for its faculty and students. The Division of Experimental Programs has as its function the support of such curricular experimentation and development. This University-wide curricular development program has three objectives: (1) a more direct relationship between campus and off-campus resources and interests; (2) cooperation among the academic divisions of the University in the development and sponsorship of new courses and programs; and (3) experimentation with new ways of teaching and learning.

Under the auspices of the Division of Experimental Programs, students, faculty, and administrators throughout the University are involved in the planning, teaching, and evaluating of experimental courses and programs. Many such curricular experiments are sponsored by other academic units of the University. There are presently two academic programs directly sponsored by the Division, the Program in Experimental Humanities and the Service-Learning Program.

The Program in Experimental Humanities offers courses which provide opportunities for students to combine sustained field-study with classroom work. These courses are taught by interdisciplinary and interdivisional faculty teams.

The Service-Learning Program integrates supervised work-study with classroom seminars. Students in the Program are assigned to community groups, research organizations, or governmental agencies. Assignments are arranged by means of a formal agreement among the student, the Program, and the off-campus agency.

The Division of Experimental Programs sponsors a special program in curricular development, the GW-Washington Project, which is charged with mobilizing academic resources throughout the University that can appropriately address needs in the Washington communities, particularly the communities of poverty. Among the activities of the Project is a technical assistance program in the Congress Heights-Anacostia area, co-sponsored by the Anacostia Community Development Consortium. The Project, in conjunction with the Spanish Education Development Center, places bilingual students in the Spanish-speaking inner city. A Community Leadership Development Program makes available short-term tuition support for community leaders and offers stipends to selected students for work in community agencies.

The Division of Experimental Programs is funded through a grant from the National Endowment for the Humanities, as well as from the general funds of the University.

ASSOCIATES

Roderick French, *Coordinator, Humanities Development Program*
Gregory Williams, *Coordinator, GW-Washington Project*
Marshall Davies, *Coordinator of Curriculum Research*

STEERING COMMITTEE

Harold Frederick Bright, *Provost and Vice President for Academic Affairs, Chairman*
Marcella Brenner, *Professor of Education*
James Franklin Burks, *Professor of French*
Ira Hubert Cisin, *Professor of Sociology*
Ralph Clarke Nash, *Professor of Law*
Thomas Eugene Piemme, *Professor of Medicine and of Health Care Sciences*
Henry Solomon, *Professor of Economics*

THE SUMMER SESSIONS

Dean W.F.E. Long

DURING THE SUMMER OF 1975, Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Government and Business Administration, the School of Public and International Affairs, the School of Engineering and Applied Science, and the Division of University Students offer courses in two 5-week sessions; the School of Medicine and Health Sciences offers courses in one 5-week session. The School of Engineering and Applied Science also offers courses in a 7-week period. The National Law Center offers courses in two 6-week sessions and one 13-week session; the School of Education offers courses in a 6- and 9-week session and three 3-week workshop sessions. In addition, a carefully planned group of special programs will be offered to serve a variety of student needs.

For a complete statement concerning summer-term work, see the *Summer Sessions Catalogue*.

OFFICE OF THE VICE PRESIDENT FOR POLICY STUDIES AND SPECIAL PROJECTS

Vice President L.H. Mayo

THE VICE PRESIDENT for Policy Studies and Special Projects is responsible to the President of the University for developing a multidisciplinary University capability for analyzing national policy issues, with involvement by the Consortium universities, foundations, federal agencies, industry, and other organizations having interaction with the governmental process.

Working closely with the Vice President for Academic Affairs, the Vice President for Policy Studies and Special Projects assists in developing faculty research capability for policy studies, recommends the introduction of new curricula in the policy analysis area—in particular at the postgraduate and advanced professional levels—and provides a continuing appraisal of the public advisement function of the University. The Office of the Vice President for Policy Studies and Special Projects serves the University as the locus for discussion and as an advisory resource on interdepartmental and interdisciplinary research related to the analysis of public policies and on curricula pertaining to broad social or environmental problems, in which a number of departments and schools participate.

This Office is responsible for coordinating activities of the Program of Policy Studies in Science and Technology with other policy-oriented projects and programs within the University.

PROGRAM OF POLICY STUDIES IN SCIENCE AND TECHNOLOGY

The primary objective of the Program of Policy Studies in Science and Technology is to encourage the continuing development of a University policy research capability directed toward the complex issues confronting society. As an integral part of the University, the Program undertakes to serve as an organizing element and to provide a neutral forum for the discussion of policy issues—current and prospective—by representing community groups, and as an advisory and research resource for policy makers in both public and private sectors.

Activities of the Program reflect a number of ways in which a wide range of interdisciplinary talents can be brought to bear upon the analysis of policy problems, particularly those involving the impact of advancing technology on the processes, values, and institutions of society.

By means of the Program of Policy Studies in Science and Technology, George Washington University is moving toward an institutional approach to the policy analysis function as contrasted with the highly fragmented and

largely uncoordinated pattern of "institutes," "centers," and "study groups" which exists at most universities. The Program of Policy Studies concept is novel in its attempt to provide an organization that strengthens the University's ability to address itself to broad issues of public policy. This approach envisages a continuing interaction among the professional staffs of the Program of Policy Studies in Science and Technology, other policy research groups, and other faculty members of the schools and departments of the University.

The following are the primary study areas of the Program:

1. The structure and functions of institutions designed to stimulate, utilize, regulate, and appraise the application of science and technology to the achievement of basic community goals, and to society's needs, national and international.

2. The application of modern research and development management concepts and skills to the planning, programming, and managing of governmental programs and urban social problem areas.

The Program has also undertaken to bring into focus the courses and seminars offered by the University which are directly related to the interface area of science, society, and public policy. An announcement is published every fall.

The Program supports or conducts a number of activities, including studies, monographs, special reports, and professional seminars with government, industry, policy research, and university representatives. An Annual Report of current activities is published in the fall.

Funding sources for the Program of Policy Studies in Science and Technology have included, in addition to the University, a basic institutional grant from NASA and grants and contracts from other sources such as the Environmental Protection Agency, the Department of Transportation, the Office of Education and the Public Health Service (Department of Health, Education and Welfare), the Department of State, the Department of Housing and Urban Development, the Russell Sage Foundation, the National Science Foundation, the Ford Foundation, the Cogar Foundation, and the Olin Charitable Trust.

PROFESSIONAL STAFF*

Director: Louis H. Mayo, *Vice President for Policy Studies and Special Projects; Professor of Law*

Associate Director: Vary T. Coates, *Senior Staff Scientist and Director, Technology Assessment Group (Political Science)*

Theodore d'Afflisio, *Research Assistant (Political Science); Teaching Fellow, George Washington University Department of Political Science*

Mary Allen, *Research Assistant, Graduate Program in Science, Technology and Public Policy (Political Science)*

Betsy Amin-Arsala, *Consultant, (Community Development)*

Robert W. Anthony, *Consultant (Physics, Systems Modeling)*

Jerome Barron, *Professor of Law*

Bonita I. Becker, *Research Assistant, Graduate Program in Science, Technology, and Public Policy*

* Staff listing consists of members who allocate all or a substantial portion of their effort to Program activities. Directors and members of the staffs of other policy study groups in the University also participate in the various seminar series, conferences, and other activities of the Program.

Guy Black, *Professor of Business Economics*
James M. Brown, *Senior Staff Scientist; Professor of Law*
Constance Castle, *Graduate Intern (Transportation Systems)*
William P. Cook, *Research Assistant (Political Science)*
Jerry Delli Priscoli, *Research Scientist; Assistant Manager, Innovation Information and Analysis Project*
John Ellingson, *Research Assistant (Law)*
Richard F. Ericson, *Senior Staff Scientist; Professor of Management*
Harold Federow, *Consultant (Law)*
Joseph V. Foa, *Professor of Engineering and Applied Science*
Jeannette Fuschini, *Editor, Innovation Information Center*
Audrey Hassanein, *Consultant (Research Information Specialist)*
Natalie Hawley, *Chief Information Specialist, Innovation Information Center*
Stephen Hessler, *Research Assistant (Law)*
Guenther Hintze, *Consultant (Electrical Engineering)*
Henry Hitchcock, *Research Assistant, (International Relations)*
Mary A. Holman, *Professor of Economics*
George E. Humphries, *Consultant (Business Administration)*
Barry I. Hyman, *Associate Professor, Department of Civil, Mechanical, and Environmental Engineering*
Jehuda Kirschinboin, *Research Associate (Statistics and Information Systems)*
Charles Lamb, *Research Associate (Political Science)*
Ann Langworthy, *Documentation Research Assistant, Innovation Information Center*
James Lester, *Research Assistant (Political Science)*
John M. Logsdon, *Research Scientist; Director, Graduate Program in Science, Technology, and Public Policy; Associate Professor of Public Affairs and Political Science*
Joseph B. Margolin, *Senior Staff Scientist; Director, Educational Policy Group*
Milton C. Marney, *Consultant (Normative Systems Research)*
Shelly Mastran, *Research Associate (Geography)*
Arthur S. Miller, *Professor of Law*
Marion R. Misch, *Research Scientist; Deputy Director, Educational Policy Group*
Henry R. Nau, *Deputy Director, Graduate Program in Science, Technology, and Public Policy; Assistant Professor of Political Science and International Affairs*
Lillian D. Regelson, *Senior Staff Assistant (Government Management)*
Judith C. Russell, *Consultant, Innovation Information Center*
Debbie Saulsbury, *Bibliographic Assistant, Innovation Information Center*
Nozer D. Singpurwalla, *Associate Professor of Operations Research*
Rosemary Slowiak, *Graduate Intern (Transportation Systems)*
Charles T. Stewart, Jr., *Professor of Economics*
Theodore Suranyi-Unger, Jr., *Senior Staff Scientist (Economics); Research Professor of Economics*
Wesley L. Tennant, *Consultant (Research and Development)*
Carol Ulinski, *Research Assistant (Graduate Program in Science, Techonology, and Public Policy)*
Ernest Weiss, *Senior Staff Scientist (Transportation Programs Specialist)*
Frederick B. Wood, *Research Scientist (Management)*

ADVISORY COMMITTEE

Chairman: Lloyd H. Elliott, *President of the University*
Vice Chairman: Bernard A. Schriever, *Chairman of the Board, Schriever & McKee, Inc., Washington, D.C.*
Harold F. Bright, *Provost and Vice President for Academic Affairs*
Arthur E. Burns, *Professor Emeritus of Economics*
Joseph L. Fisher, *U.S. House of Representatives (Va.-10th Dist.)*
Lawrence Levy, *President, Interprise, Inc., Framingham, Mass.*
Dwight Waldo, *Albert Schweitzer Professor in the Humanities, Syracuse University*
Reuben E. Wood, *Professor of Chemistry*

CENTER FOR ADMINISTRATIVE JUSTICE

PROFESSIONAL STAFF

Director: Milton M. Carrow, *Visiting Professor of Law*
Director of Education: Robert E. Park, *Professor of Law*

BOARD OF DIRECTORS

Chairman: Ashley Sellers, *Attorney, Washington, D.C.*
Vice Chairman, Budget Officer: Franklin M. Schultz, *Attorney, Washington, D.C.*
Secretary: Ben C. Fisher, *Attorney, Washington, D.C.*
Frederick Davis, *Edward H. Hinton Professor of Law, University of Missouri, Columbia*
Henry J. Friendly, *Chief Justice, United States Court of Appeals, Second Circuit, New York, N.Y.*
Louis J. Hector, *Attorney, Miami, Fla.*
Louis H. Mayo, *Vice President for Policy Studies and Special Projects* (ex officio member)
Victor G. Rosenblum, *Director, Program in Law and Social Sciences, Northwestern University*
Harold L. Russell, *Attorney, Atlanta, Ga.*
Antonin Scalia, *Chairman, Administrative Conference of the United States* (ex officio member)
Bernard Schwartz, *Webb Professor of Law, New York University*
Frank M. Wozencraft, *Chairman, Section of Administration Law, American Bar Association* (ex officio member)

The Center for Administrative Justice was established by the American Bar Association and became affiliated with George Washington University in September, 1973. It received its initial funding from the American Bar Endowment.

The purpose of the Center is the advancement of administrative justice in society. Its goals are as follows:

to provide educational and training opportunities in the law and related areas involved in the processes of administrative justice;

to engage in basic research in such areas and to undertake particular research projects for governmental and nongovernmental agencies;

to provide a resource for the initiation, exploration, and development of new oncepts, methods, and mechanisms for the improvement of the processes of dministrative justice;

to foster the development of ethical standards in the public interest among one engaged in the processes of administrative justice;

to establish and maintain a comprehensive library of materials pertaining o the law and law-related areas of administrative justice;

to publish and disseminate the Center's own and other basic and current aterials in such areas;

to conduct conferences, seminars, workshops, colloquia, institutes, and other ppropriate means for implementing all of the above goals.

The Center commenced its activities in March, 1973, by undertaking a ilot project in the area of "mass administrative justice," as manifested in the ield of welfare administration. Concentrating on the so-called "fair hearing" rocess, it convened a group of 60 academics, administrators, social workers, olitical scientists, and lawyers to discuss it, and is now following up with raining programs for personnel participating in the hearing process.

Future projects in a variety of areas where administrative justice is a signifi- ant factor will be modelled on the pilot project. Examples of possible sub- ects include health administration, zoning, transportation, occupational licens- ng, and academic discipline.

A second type of project conducted by the Center during its first year was he drafting of a state administrative procedure act at the request of the Law Revision Council of the State of Florida. This was done by a task force of minent scholars and practitioners who convened at the National Law Center.

The basic program of the Center will consist of a series of intensive courses ffered each year during a six- to eight-week period from about May 15th to July 15th at George Washington University and possibly at other institu- ions. These will include in-depth seminars in specialized areas of administra- ive law and current problems and techniques of administrative practice.

Other types of activities and projects will be undertaken as the Center evelops.

HEALTH STAFF SEMINAR (HSS)

Judith K. Miller, *Director*

The Health Staff Seminar is designed to assist professional staff members employed by the executive and legislative branches of the federal government n the field of health to obtain a more realistic understanding of actual health practices and problems, and to improve communications between Washington- ased professional staff members and experts in the field. Exposure to prob- ems and issues facing the entire country is gained primarily through sequenced evening discussions or workshops and, where appropriate, site visits to various ealities. Although attendance is primarily limited to Congressional aides and p-level health staff from the many government agencies involved in health, GWU students and faculty can be accommodated on a space-available basis.

INSTITUTE FOR EDUCATIONAL LEADERSHIP

Samuel Halperin, *Director*
Norman Drachler, *Director, Leadership Training Institute*
George Lane, *Director, Educational Staff Seminar*
James Browne, *Coordinator, The Associates Program*
Paul Schindler, *Director, Washington Internships in Education*
Kenneth C. Fischer, *Director, Postsecondary Education Convening Authority*
John Merrow, *Communications Coordinator*

The Institute for Educational Leadership (IEL) seeks to strengthen prese and potential leadership in American Education at the policy levels of sta and federal governments. Established in 1971, IEL is a policy planning an coordinating agency for a number of related educational programs, includin Washington Internships in Education, Educational Staff Seminar, and Th Associates Program. Newer IEL programs include a Postsecondary Educatio Convening Authority supported by a grant from the Fund for the Improvem of Postsecondary Education, the Leadership Training Institute, and a seri of programs on major educational issues heard twice monthly over Nation Public Radio and its 175 affiliated stations. IEL is supported by a grant fro the Ford Foundation and by various federal grants and contract.

The objectives of the Institute are carried out under programs and activiti of the following types:

1. *Washington Internships in Education* (*WIE*) began its 11th program ye in September, 1974. WIE gives participants an opportunity to learn abo the education policy-making process at the federal and state levels and become familiar in some depth with the major educational issues being de with at these levels. Interns are assigned to a public or private agency an participate regularly with fellow interns in an educational component consistin of seminars and field trips.

There is no "typical" WIE intern. All bring a variety of background e perience to the program—as teachers, community workers, lawyers, and jou nalists. They all have one thing in common: a commitment to learning mo about educational policy making by participating in the WIE program.

Former interns have assumed educational leadership positions in state d partments of education, in colleges and universities, in large metropolit school systems, and in the educational associations. WIE alumni can also found in policy-making positions in federal agencies and with Congress.

2. *Educational Staff Seminar* (*ESS*) is a professional development progra designed for staff members employed by the executive and legislative branch of the federal government in the field of education. The goals of ESS are provide an open forum in which participants can improve their professio capabilities and personal fulfillment on the job by: (a) being exposed to n ideas and perspectives; (b) increasing their knowledge of particular subs and their understanding of how things actually operate in the field; and meeting with other professionals involved in the legislative and policy form lation processes in an informal learning environment which fosters impro professional relationships.

ESS supplements the Washington work experience with a variety of in-serv training seminars and in-the-field observation. It was established in 1969

s funded by IEL and by partial reimbursement from the government agencies erved.

3. *The Associates Program* (*TAP*) works in the states in a manner similar o Educational Staff Seminar in Washington. Started in 1972, TAP now ponsors State Educational Seminars in 20 states. A typical seminar provides a neutral forum which allows state legislators, education association leaders, and key executive branch policy-makers to discuss state educational policy ssues. Twenty Associates serve on a part-time basis, arranging five to seven eminars annually. States often call on IEL for appropriate speakers and naterials. TAP helps defray the cost of the seminars.

In addition, full-time Associates serve as education advisers in the office of the governor, the chief state school officer, or an equally important educational policy office. TAP Associates now serve in Arkansas, the District of Columbia, Maryland, and with the New England Board of Higher Education.

TAP expects that its network will remain flexible and innovative and that successful state seminars will trigger local financial support, improved communications among educational policy-makers, and ultimately, more thoughtful and effective educational policies for the states.

OTHER IEL ACTIVITIES

Under a grant from the Department of Health, Education and Welfare's Fund for the Improvement of Postsecondary Education, IEL has established a *Convening Authority* for consideration and transmission of key policy issues in postsecondary education. IEL has arranged several task forces, regional seminars, and national policy conferences on "reconciling public demands for accountability with institutional and student demands for diversity in postsecondary education."

The *Leadership Training Institute* (*LTI*), now in its sixth year, is based on the premise that the leadership, administration, and management of schools are central to the success of our educational system. The LTI examines questions of leadership preparation and has given particular attention to problems of training for minorities and other neglected groups.

In cooperation with National Public Radio, IEL is producing a series of one-hour programs on key educational issues. The programs called "Options on Education," are heard over 175 NPR stations.

SPONSORED RESEARCH

Assistant Vice President for Research C.J. Lange

THE RESEARCH PROGRAMS listed in this section are special programs which are established for the specific purpose of attacking in an academic atmosphere problems proposed by the individual projects or submitted by the sponsoring agency. Cooperation between these programs and the various departments of instruction is as close as the nature and needs of the programs and departments will permit.

BIOMETRIC LABORATORY

Director R.R. Bonato

The Biometric Laboratory, established in the fall of 1960 and currently supported by the National Institute of Mental Health grant program, is engaged in a broad spectrum of psychotropic drug asssesment. The Laboratory assists investigators throughout the United States in planning research and in analyzing data. The majority of these research projects concern the effects of drugs on behavior.

CENTER FOR MANPOWER POLICY STUDIES

Director Sar A. Levitan

The Center for Manpower Policy Studies is devoted to the evaluation of federally-supported manpower, antipoverty, and related programs. The Center is financed by a grant from the Ford Foundation and offers in conjunction with the Department of Economics graduate courses in labor economics and manpower policy.

EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) CLEARINGHOUSE ON HIGHER EDUCATION

Director Peter P. Muirhead
Associate Director Jonathan D. Fife

The Educational Resources Information Center (ERIC) Clearinghouse on Higher Education, established in the fall of 1968, is supported by the National Institute of Education. ERIC is responsible for the acquisition, evaluation, abstracting, indexing, and dissemination of research reports and other documents dealing with problems and issues in the field of higher education. It also prepares state-of-the-art and review papers related to higher education.

HEALTH STAFF SEMINAR (HSS)

See the Office of the Vice President for Policy Studies and Special Projects, page 193.

INSTITUTE FOR EDUCATIONAL LEADERSHIP

Washington Internships in Education
Educational Staff Seminar
The Associates Program
Postsecondary Education Convening Authority
Leadership Training Institute

See the Office of the Vice President for Policy Studies and Special Projects, pages 194–95.

INSTITUTE FOR MANAGEMENT SCIENCE AND ENGINEERING

Director W.H. Marlow

The Institute for Management Science and Engineering provides a multidisciplinary environment for innovative graduate teaching and substantial opportunities for research activities and public service under diversified sources of external support. Through its Program in Logistics, the Institute performs research leading to the development of a science in logistics featuring principles and methodology for resource allocation problems in civil affairs and national defense efforts.

MID-EAST REGIONAL RESOURCE CENTER

Director Raymond S. Cottrell

The Mid-East Regional Resource Center is composed of the states of Delaware, Maryland, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, and the District of Columbia. The George Washington University proposes to enter into a partnership with the University of Kentucky and the University of North Carolina to establish a cohesive, integrated, coordinated Learning Resource System (LRS) for handicapped children. GWU projects four major goals, 14 enabling objectives, and 21 strategies designed to create a unified, in tandem, approach to meeting the educational needs of handicapped children in the region.

NATURAL RESOURCES POLICY CENTER

Director Mary Holman

The Natural Resources Policy Center was established in September, 1965, to sponsor faculty and student research in the area of natural resources and environmental quality; to develop and undertake activities that promote undergraduate and graduate education; and to train employees of public resource agencies. The program of the Center focuses particularly on increasing the contribution of the social sciences—economics, planning, and the political institutions of natural resource agencies—so that these disciplines and related

fields of knowledge may be brought to bear more fruitfully on contemporary problems relating to the management and development of natural resources. The Natural Resources Policy Center, which provides a focus on natural resource and environmental quality problems and issues, is an integral part of the Department of Economics in both the design of its research program and its courses.

PROGRAM OF POLICY STUDIES IN SCIENCE AND TECHNOLOGY

See the Office of the Vice President for Policy Studies and Special Projects, pages 189–92.

SOCIAL RESEARCH GROUP

Director I.H. Cisin
Associate Director H.J. Parry

The Social Research Group conducts surveys and experiments with concentration on basic research underlying an approach to the solution of social problems.

COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES OF THIS CATALOGUE, under the alphabetically arranged names of the departments of instruction and special interdepartmental programs, are listed the courses of instruction offered by the University in the academic year 1975-76. The courses as here listed are subject to change. The University reserves the right to withdraw any course announced.

HOURS OF INSTRUCTION

Classes are scheduled in the morning, afternoon, and evening. Evening and daytime sections of the same course are identical, are taught by the same staff of instructors, and carry the same amount of credit. By taking the evening and summer classes and extending the time of study beyond the usual four years, a part-time student may complete the requirements and obtain a degree.

EXPLANATION OF COURSE NUMBERS

First-group courses.—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the adviser and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be taken for graduate credit.

Second-group courses.—Courses numbered from 101 to 200 are planned for students in the junior and senior years. Except for Accounting courses, they may be taken for graduate credit only upon the approval of the Dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work in order to receive graduate credit. Accounting courses numbered 101-200 may not be taken for graduate credit.

Third-group courses.—Courses numbered from 201 to 300 in the Graduate School of Arts and Sciences and the School of Government and Business Administration, and courses numbered 201 to 400 in the School of Education, are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors in the School of Government and Business Administration registering for these courses must have a 3.00 average, the prior approval of

the department chairman who is responsible for the graduate course, and the prior approval of the Dean. Nondegree students who have not completed a Bachelor's degree may not enroll in graduate courses offered by the School of Government and Business Administration.

Fourth-group courses.—Courses numbered 301 to 400 in the Graduate School of Arts and Sciences are limited to graduate students; but they are primarily for doctoral candidates. Courses numbered 301 to 400 in the School of Government and Business Administration are limited to doctoral students. In the School of Education fourth-group courses, numbered 401 to 500, are limited to graduate students with Master's degrees from accredited institutions.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designations.

Acct	Accounting
AmCv	American Civilization
Anat	Anatomy
Anth	Anthropology
ApSc	Applied Science
Art	Art
ArTh	Art Therapy
Bioc	Biochemistry
BlSc	Biological Sciences
BAd	Business Administration
Chem	Chemistry
Chin	Chinese
CE	Civil Engineering
Clas	Classics
CSci	Computer Science
Econ	Economics
Educ	Education
EPol	Education Policy
EE	Electrical Engineering
EAd	Engineering Administration
EngS	Engineering Science
Engl	English
Envr	Environmental Studies
Hum	Experimental Humanities
ForS	Forensic Sciences
Fren	French
Gnet	Genetics
Geog	Geography and Regional Science
Geol	Geology
Germ	Germanic Languages and Literatures
HCA	Health Care Administration
Hist	History
HonP	Honors Program—Columbian College
HKLS	Human Kinetics and Leisure Studies
Ital	Italian
Jap	Japanese
Jour	Journalism
Mgt	Management Science
Math	Mathematics
ME	Mechanical Engineering
Med	Medicine
Micr	Microbiology
Mus	Music
OR	Operations Research
Path	Pathology
Phar	Pharmacology
Phil	Philosophy
Phys	Physics
Phyl	Physiology
PSc	Political Science
Port	Portuguese
Psyc	Psychology
PAd	Public Administration
Rel	Religion
SHum	Service-Learning Experimental Humanities
SPSc	Service-Learning Political Science
Slav	Slavic Languages and Literatures
Soc	Sociology
Span	Spanish
SpEd	Special Education
SPDR	Speech and Drama
Stat	Statistics
U&RP	Urban and Regional Planning
WStu	Women Studies

SEMESTER HOURS OF CREDIT

The number of semester hours of credit given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the name of the course. Thus, a year course giving 3 hours of credit each semester is marked

(3–3), and a semester course giving 3 hours of credit is marked (3). A semester hour usually consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

TIME OF COURSE OFFERINGS

Following most course descriptions is a parenthetical statement listing the semester (fall or spring) for which the course is scheduled for 1975-76. The term "academic year" is used only with two-semester courses, and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. If no parenthetical statement appears, the course is not scheduled to be offered during the fall or spring semesters of 1975-76. Offerings for the summer sessions are not designated in this catalogue. Students should consult the *Summer Sessions Catalogue* or *Schedule of Classes* for summer offerings. A *Schedule of Classes* is also published for each fall and spring semester which provides more exact and up-to-date information concerning the time of course offerings.

Accounting

Professors **E.J.B. Lewis, A.J. Mastro (*Chairman*)**
Professorial Lecturers M.P. Pujol, Leo Herbert, Shawki Farag, Joseph Hilmy
Associate Professors F.C. Kurtz, Chei-Min Paik, M.G. Gallagher
Assistant Professorial Lecturer **E.J. Shuchart**

Bachelor of Business Administration in the field of Accounting.—See pages 135–41.

Master of Business Administration with a field of concentration in Accounting.—Prerequisite: **a Bachelor's degree, see pages 146–47.**

Required: the general requirements, pages 147–50. A "common body of knowledge" in business administration is required of all candidates; this knowledge may be obtained as part of an undergraduate degree in business or as part of the total Master of Business Administration degree program at this University. The "common body of knowledge" may be satisfied by the following courses at this University, or the equivalent: Acct 115; BAd 131, 141, 161, 198; Econ 1; Mgt 118; and Stat 111. In addition to this requirement the student's program of study will consist of (1) the "Required Courses in Administration," including Acct 276 (see pages 146–47); (2) Acct 262, 295, BAd 231; (3) (a) for students not electing a thesis—Acct 275, 282, 296, and 6 semester hours of elective, or (b) for students electing a thesis—Acct 275 or 282, and Acct 299, 300, and 6 semester hours of elective. Acct 215 must be taken in place of Acct 275 or 282 if a course in cost and budgetary control was not taken prior to entering the M.B.A. degree program. Elective courses are selected, with the approval of the adviser, from courses in other fields offered by the School; however, no more than 3 hours may be in one field, and none of the courses may be in Accounting.

Programs of study in Accounting leading to the degrees of *Doctor of Business Administration and Doctor of Public Administration.*—See pages 159–62.

Accounting courses numbered below the 200 level may not be taken for graduate credit. Accounting courses numbered 201 and above may not be taken for undergraduate credit.

FIRST GROUP

1–2 **Introductory Accounting** (3–3) Gallagher, Kurtz

Basic understanding of accounting concepts, procedures, analyses, and reports; the accounting measurement and communications of significant economic and financial data. Prerequisite to Acct 2: Acct 1. Students who have received credit for Acct 115 cannot receive credit for Acct 1–2. (Acct 1 and 2—fall and spring)

SECOND GROUP

101 **Cost and Budgetary Control** (3) Farag

Cost behavior and volume-profit relationships, responsibility accounting, standard costs, flexible budgets, cost structures for control and motivation, relevant costs, cost concepts. Prerequisite: Acct 1–2. Students who have received credit for Acct 193 or 215 cannot receive credit for Acct 101. (Fall and spring)

111 **Financial Statement Analysis** (3) Farag, Hilmy

Analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors. Prerequisite: Acct 1–2. (Spring)

115 **Survey of Financial Accounting** (3) Gallagher

Development, presentation, and interpretation of financial accounting data necessary to the management process. Students who have received credit for Acct 1–2 cannot receive credit for Acct 115. (Fall and spring)

121 **Intermediate Accounting** (3) Mastre

In-depth study of accounting functions and basic theory; acquisition of assets and services, income and equity accounting, preparation and analysis of financial statements. Prerequisite: Acct 1–2. (Fall)

122 **Intermediate Accounting** (3) Kurtz

An in-depth study of special topics: partnership, consignment, installment, liquidation, retail, estate, and trust accounting. Prerequisite: Acct 121.

132 **Accounting Theory** (3) Mastre

Current thought as reflected in the pronouncements of leading professional and accounting research associations, major contributions to accounting literature. Prerequisite: Acct 121. (Spring)

141 **Governmental Accounting** (3) Lewis, Pujol

Appropriation, encumbrance, and fund accounting for governmental and institutional entities. Prerequisite: Acct 1–2. (Fall)

144 **Federal Accounting** (3) Lewis

Accounting procedures in the federal government, with emphasis on agency-level accounts and accounting support for cost-based budgets. Prerequisite: Acct 141.

161 **Federal Income Taxation** (3) Gallagher

Federal income tax concepts applicable to individuals and corporations; differences between tax accounting and financial accounting. (Fall and spring)

162 **Tax Research and Planning** (3) Gallagher

Substantive federal tax provisions relating to corporations, partnerships, security transactions, estates, gifts, and pension and profit-sharing plans; emphasis on tax research and tax-planning objectives.

171 **Auditing** (3) Kurtz

Principles and procedures of auditing: generally accepted auditing standards, internal control, audit objectives and reports, form-preparation-use of audit work papers, audit evidence. Prerequisite: Acct 121. (Fall)

172 **Audit Planning and Control** (3) Kurtz

Standards of audit reporting and other current auditing topics, including application of statistical sampling techniques to auditing, auditing electronic systems, and management advisory services. Prerequisite: Acct 171.

181 **Accounting Systems** (3) Hilmy

Organization and use of accounting information: origination, classification, control, and reporting; development, design, and installation of accounting systems; accounting communication patterns. Prerequisite: Acct 101, 171. (Spring)

191 **Advanced Accounting** (3) Gallagher

Application of accounting theory to special areas: consolidated statements, business combinations, earnings per share, foreign exchange, price-level adjusted statements, source and application of funds. Prerequisite: Acct 121. (Spring)

193 **Business Budgeting** (3) Lewis, Paik

Principles and procedures in the development, installation, and operation of a system of budgetary control to aid management. Prerequisite: Acct 1–2. Students who have received credit for Acct 101 cannot receive credit for Acct 193. (Fall and spring)

196 **Management Decisions and Accounting** (3) Paik

Analysis of data required in capital budgeting, inventory management, and other decisions; cash-flow and probability data; advanced cost accounting systems. Prerequisite: Acct 101.

199 **Accounting Practice Internship** (3) Mastro

Concepts, procedures, and standards of auditing practice obtained as an intern with a firm or agency. Prerequisite: 15 semester hours of Accounting courses (including a course in auditing), senior status, and approval of the Chairman of the Department.

THIRD GROUP

215 **Survey of Managerial Accounting** (3) Paik, Herbert

Study of the nature, analysis, and interpretation of accounting reports primarily from the management point of view. Prerequisite: Acct 1–2 or 115. Students who have received credit for Acct 101 cannot receive credit for Acct 215. (Fall and spring)

231 **Contemporary Accounting Theory** (3) Mastro

Accounting principles and concepts and recent theories concerned with the valuation and amortization of assets and determination of income. Prerequisite: 6 semester hours of accounting.

241 **Accounting and Related Disciplines** (3) Paik

Interrelationships of accounting and behavioral sciences, economics, mathematical methods, operations research. Prerequisite: 6 semester hours of accounting.

245 **Decision Systems and Accounting** (3) Paik

Limited to students in the Navy Graduate Financial Management Program. Managing financial and related information systems in complex organizations; relationships between accounting in its broadest sense and management control and decision systems.

246 **Governmental Accounting and Budgeting Problems** (3) Lewis

Current problems in federal financial planning, programming, budgeting, accounting, and auditing. Prerequisite: Acct 144.

262 **Business Income Taxation** (3) Gallagher

Federal income tax concepts applicable to corporations, partnerships, and their owners; emphasis on tax planning factors in business decisions and tax research. (Fall)

275 **Contemporary Auditing Theory and Procedures** (3) Kurtz

Study of auditing concepts: generally accepted auditing standards, application of statistical sampling to auditing, audit of electronic data processing systems. Prerequisite: Acct 1–2 or 115. (Spring)

276 **Management Planning and Control** (3) Paik, Herbert

Integrative case study approach to management systems for planning, control, and decisions: value indices for organizational sub-units, transfer pricing, contemporary control systems, accounting framework and cycle. Prerequisite: Acct 1–2 or 115. (Spring)

282 **Accounting Information Systems** (3) Hilmy

Development and application of accounting system theory, including analysis, design, and implementation. Integration of automatic data processing, accounting systems, and management information systems. Prerequisite: Acct 1–2 or 115. (Fall)

290 **Special Topics in Accounting** (3) Staff

An experimental course enabling the department to develop new course topics and test new teaching methods. May be repeated once for credit. (Fall or spring)

292 **Professional Accounting Review** (3) Lewis

Review and coordination of principles and techniques in preparation for general practice in the field of accountancy and for professional accounting examinations. Prerequisite: Acct 101, 141, 161, 171, and 191.

295 **Research Methods** (3) Hilmy

(Spring)

296 **Seminar in Accounting** (3) Mastro
Selected accounting studies: critical analysis and evaluation developed in seminar discussions and papers. Prerequisite: Acct 1–2 or 115. (Spring)

298 **Directed Readings and Research in Accounting** (3) Mastro and Staff

299 **Thesis Seminar** (3) Mastro and Staff
(Fall and spring)

300 **Thesis Research** (3) Mastro and Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Mastro and Staff
Limited to students preparing for the Doctor of Business Administration or Doctor of Public Administration general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Mastro and Staff
Limited to Doctor of Business Administration or Doctor of Public Administration candidates. May be repeated for credit. (Fall and spring)

American Literature

See "English."

American Studies Program

Professors R.H. Walker, Jr., C.C. Mondale, Letitia Brown
Associate Professorial Lecturers James Mahoney, Jr., B.M. Mergen
Assistant Professor H.F. Gillette, Jr. (*Director*)
Special Lecturer Lillian Miller

FACULTY ADVISORY COMMITTEE

H.F. Gillette, Jr. (*Chairman*), F.S. Grubar, R.L. Humphrey, H.L. LeBlanc, G.E. McCandlish, C.H. Pfuntner, R.P. Sharkey, R.W. Stephens, A.M. Yezer, Dewey Wallace, Jr.

AMERICAN STUDIES COUNCIL

The Council serves the American Studies Program in an advisory capacity from several points of view, as follows:

From the Washington Community

Aaron Goldman, *President, Macke Vending Co.*
Laughlin Phillips, *Editor,* The Washingtonian
Sterling Tucker, *Vice Chairman, District of Columbia Council*

From the Student Body

Two undergraduate students; two graduate students.

From the Alumni

C. Robert Kemble

From Affiliated Programs

Robert H. Land (Library of Congress)
Atlee Schidler (Washington Center for Metropolitan Studies)
Wilcomb E. Washburn (Smithsonian Institution)

From the Faculty

The American Studies staff of instruction and the Faculty Advisory Committee, ex officio

---

Bachelor of Arts with a major in American Civilization (Field-of-Study).—The following requirements must be fulfilled.

1. The general requirements stated on pages 76–77, 83–89.

2. Prerequisite course—AmCv 71–72. (In preparation for the major field it is recommended that students elect introductory courses in Anthropology, Art, Economics, English, Geography and Regional Science, History, Philosophy, Political Science, Religion, and Sociology.)

3. Required courses in the major—(a) 15 semester hours of approved second-group courses in the Humanities (History may be elected for (a) or (b), but not for both); (b) 15 semester hours of approved second-group courses in Social Studies; (c) AmCv 179–80, which must be taken in the senior year.

4. In addition to the "meaningful initiation" requirement (see pages 76–77), students must elect 3 or 4 additional semester hours in the Natural and Mathematical Sciences or in Geography and Regional Science.

The major examination required of all seniors must be satisfactorily completed in the final year.

Special Honors will be awarded to students who fulfill the general requirements (see pages 50–51) and in addition (1) receive grades of *A* in at least half of their courses in the major field, and (2) receive honors in the major examination.

Two years of a foreign language or adequate preparation in statistics, logic, or linguistics is strongly recommended. Students should consult frequently with an American Civilization adviser.

Master of Arts in the field of American Civilization.—Prerequisite: the degree of Bachelor of Arts with an undergraduate major in American Civilization or in the subject in which concentration is contemplated.

Required: the general requirements, pages 93–100, including (1) AMCv 271–72 (6 semester hours), a seminar in the methods and materials for teaching and research in American Civilization; (2) 18 additional semester hours in a carefully related pattern, focusing in a concentrated approach to the study of American Civilization; (3) a Master's thesis (6 semester hours) written on an approved topic under the

direction of the instructor in whose field the major emphasis falls; (4) a Master's Comprehensive Examination reflecting the candidate's area of concentration.

Doctor of Philosophy in the field of American Civilization.—This program combines work in the humanities and/or social sciences as preparation for research and teaching, with the option of stressing preparation for museum and library careers. Applicants are required to have an adequate background in the humanities and/or social sciences as they apply to the understanding of American civilization.

Required: the general requirements, pages 93–97, 100–102. Candidates must pass a General Examination in four areas. An area in American Cultural History and an area in the culture of some area outside the United States (i.e., English Literature, European History) are required. The other two areas may be chosen from the following groups: (1) American Diplomatic, Economic, Political, or Social History; American Literature, Art, Philosophy, or Religion; Afro-American History; or some areas of the social and behavioral sciences; (2) in affiliation with the Library of Congress—supervised historical study in bibliographic resources including American History and Politics, Cartography, Cross-cultural Studies, Government Documents, Graphic Arts and Music, Motion Pictures and Recorded Sound, Printing and Bookmaking; (3) in affiliation with the Smithsonian Institution (Museum of History and Technology, National Portrait Gallery, and National Collection of Fine Arts)—supervised studies including Architectural History, Ethnohistory, Historical Archaeology, History of Science, History of Technology, Industrial Archaeology, Material Aspects of American Civilization, and various fields in the History of Art. Additional areas of study may be arranged within the University and in both the Library of Congress and Smithsonian cooperative programs. Special announcements concerning these programs are issued periodically and are available in the Office of the Director of the American Studies Program.

Reseach fields for the dissertation may be chosen from any of the above except those dealing with the culture of an area outside the United States.

AMERICAN CIVILIZATION

FIRST GROUP

71–72 **Introduction to American Civilization** (3–3) Mergen, Gillette

Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance. (Academic year)

SECOND GROUP

161–62 **Studies in American Literature** (3–3) Sten

Same as Engl 161–62. Major factors in the national cultural tradition as shown by outstanding writers. (Academic year)

179–80 **Proseminar in American Civilization** (3–3) Walker, Mondale

Coordinating course for seniors majoring in American Civilization. (Academic year)

186 **U.S. Urban History** Gillette

Same as Hist 186. Development and characteristics of American cities. (Fall)

*192 **The American Cinema** (3) Mergen

History and criticism of American films. The course will enable the student to develop an ability to see and evaluate cinema techniques, to express the evaluation clearly in writing, and to understand the role of films in the context of American culture. (Spring)

195 **Independent Study** (3) Staff

Open to a limited number of American Civilization majors with approval of instructor. (Fall and spring)

†197 **Oral History and Interview Techniques** (4) Staff

Introduction to theory and practice of obtaining and using historical data through recorded interviews. Examination of major published works in oral history. Particular attention to ongoing oral history projects in the Washington area. (Spring)

THIRD GROUP

*225 **History of Washington, D.C.** (3) Brown

271–72 **Seminar: Research and Teaching in American Civilization** (3–3) Mergen

Consideration of American studies as an area for research and teaching; introduction to bibliography. Required of candidates for the degree of Master of Arts in the field of American Civilization. (Academic year)

*273–74 **Research Seminar: Materials in Afro-American Culture** (3–3) Brown

Prerequisite: Hist 173–74 or equivalent. (Academic year 1976–77 and alternate years)

280 **Seminar: Urban History** (3) Gillette

(Spring)

281 **Seminar: Early American Literature** (3) McCandlish

Same as Engl 281. (Fall and spring)

289–90 **Seminar: Topics in American Civilization** (3–3) Mergen

Research problems selected by the instructor. Preparation in American Cultural History or other area appropriate to the topic of the seminar. (Academic year)

295 **Independent Study** (arr.) Staff

Limited to Master's candidates. Permission of instructor, in writing, required. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

* Joint offering of the American Studies Program and the Department of Speech and Drama.
† Joint offering of the American Studies Program and the Departments of Anthropology and History.

FOURTH GROUP

*373–74 **Readings on the Negro in American Culture** (3–3) Staff

For students preparing for the Doctor of Philosophy general examination in the field of the Negro in American Culture. (Academic year 1975–76 and alternate years)

379–80 **Readings in American Cultural History** (3–3) Walker

For students preparing for the Doctor of Philosophy general examination in the field of American Civilization. (Academic year)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

COURSES OFFERED IN AFFILIATION WITH THE LIBRARY OF CONGRESS

The Graduate School of Arts and Sciences is affiliated with the Library of Congress in a program leading to the degree of Doctor of Philosophy. The following courses are offered at the Library of Congress by members of its staff:

THIRD GROUP

255–56 **Research Orientation Seminar: Americana in the Library of Congress** (3–3)

Examination of the collections of the Library of Congress with the aim of increasing understanding of American culture and awareness of library-oriented research problems and possibilities. For students in the affiliated doctoral program, this course may lead directly to a field in "Research Materials for the Study of American Life: Their Content, Collection, Arrangement, and Use." (Academic year 1975–76 and alternate years)

FOURTH GROUP

355–56 **Practicum: Advanced Library Research** (3–3)

Practical problems in control of library materials with emphasis on collections in the Library of Congress. A reading field in the affiliated program. Prerequisite: AmCv 255–56. (Academic year)

389 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Library of Congress. May be repeated for credit. (Fall and spring)

* Joint offering of the American Studies Program and the Department of History.

390 **Dissertation Research** (arr.)

For Doctor of Philosophy candidates preparing dissertations based upon or significantly related to collections of the Library of Congress. Supervised by specialists at the Library. Prerequisite: AmCv 355–56. (Fall and spring)

COURSES OFFERED IN AFFILIATION WITH THE SMITHSONIAN INSTITUTION

The Graduate School of Arts and Sciences is affiliated with the Smithsonian Institution's Program for Graduate Students in the History of American Civilization. The following courses are offered at the Museum of History and Technology and at the National Portrait Gallery, by members of their staffs:

THIRD GROUP

250 **Orientation Course: Material Aspects of American Civilization** (3)

Familiarization with the historical collections of the Smithsonian Institution and introduction to opportunities for research and publication based on historical objects. Required of all students in the Master's and doctoral programs affiliated with the Smithsonian Institution. (Fall)

251–52 **Museum Research and Education** (3–3) Washburn and Staff

Supervised work and/or study under the direction of Smithsonian staff members and research associates—museum visitor behavior, costumes and furnishings, decorative arts, and photography as historical documentation. (Fall and spring)

*270 **Seminar: Museum Exhibiting** (3) Mahoney

Selected museum exhibiting problems in the social and natural sciences, including methods and techniques of exhibition, problems of museum communication, education, etc. (Fall)

†284 **Seminar: Studies in American Art and History** (3) Miller

Exploration of selected problems and themes in American cultural history involving the use of artistic materials in different media; emphasis on methodology and analytic techniques. (Spring)

‡294 **Field Research in Historical Archaeology** (3)

Field techniques, including excavation, recording, photography, preservation, laboratory analysis and interpretation, supplemented by seminars on the history, ethnography, and ethnohistory of 17th century St. Mary's City, Md.

FOURTH GROUP

351–52 **Research in Selected Aspects of American Civilization** (3–3)

Supervised study and/or field work in selected subject areas related to the activities of the Smithsonian Institution. Prerequisite: AmCv 250. (Academic year)

---

* Joint offering of the American Studies Program and the Department of Anthropology.
† Joint offering of the American Studies Program and the Department of Art.
‡ Joint offering of the American Studies Program and the Department of Anthropology in cooperation with St. Mary's College, the Smithsonian Institution, and the St. Mary's (Md.) City Commission.

394 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Smithsonian Institution. May be repeated for credit. (Fall and spring)

395 **Dissertation Research** (arr.)

For Doctor of Philosophy candidates preparing dissertations significantly related to the material aspects of American civilization. Students work under curatorial supervision at the Smithsonian Institution. Prerequisite: AmCv 351–52. May be repeated for credit. (Fall and spring)

Anatomy

Professors C.M. Goss (*Visiting—Medical History*), F.D. Allan, T.N. Johnson, R.S. Snell (*Chairman*)
Professorial Lecturers J.L. Angel, T.S. Reese
Associate Professors E.N. Albert, Marilyn Koering
Associate Professorial Lecturers J.A. Di Paolo, Joan Blanchette-Mackie, Kathleen Weston
Assistant Professors Ann Butler, D.E. Morse, M.D. Olson, J.M. Kerns
Assistant Clinical Professor G.P. Bogumill
Adjunct Assistant Professor I.H. Leverton
Special Lecturer Mary Ericksen

Doctor of Philosophy in the field of Anatomy.—Required: the general requirements, pages 93–97, 100–102. Candidates must fulfill the tool requirement by demonstrating high proficiency in German, French, or Russian or by demonstrating a reading knowledge of any two of the above languages. At the discretion of the Department, one of the above languages may be replaced by the passing with a grade of *B* or better of an approved course in biostatistics or computer programming. The General Examination must cover at least three fields.

Research fields: Cell Ultrastructure, Embryology, Gross Anatomy, Histology, Human Genetics, Neuroanatomy, and Physical Anthropology.

202 **Gross Anatomy** (6) Snell and Staff

Regional dissections of adult cadaver supplemented with lectures and X-rays. Laboratory fee, $30. (Fall)

203 **Human Embryology** (1) Allan

Origin and development of human body; emphasis on value of embryology in interpreting anatomical anomalies. (Fall)

204 **Neuroanatomy** (2) Johnson, Butler

Gross and microscopic anatomy of central nervous system and special senses. Laboratory fee, $13. (Fall)

205 **Human Microscopic Anatomy** (3) Albert and Staff

Microscopic structure of cells, tissues, and organs of the human body. Laboratory fee, $20. (Fall)

206 **Electron Microscopic Histochemistry** (3) Albert

Experimental study of electron histochemical techniques. Prerequisite: Anat 205 or equivalent. Laboratory fee, $30. (Spring) (Not offered 1975)

208 **Comparative Vertebrate Neurology** (1) Butler, Johnson

Survey of the evolution of the vertebrate brain. Prerequisite: Anat 204. Laboratory fee, $10. (Spring)

209 **The Use of Audio-visual Techniques in Anatomy** (2) Allen

Preparation of a significant audio-visual program of some aspect of human anatomy. Laboratory fee, $20. (Spring)

210 **The Use of Computers in Anatomy** (2) Snell

Applying computer techniques to the problems of learning anatomy. Limited enrollment. Laboratory fee, $20. (Spring)

211 **Cell Biology** (2) (Same as Phyl 211) Staff

An integrated survey of the structure, function, and metabolism of the cell, as an introduction to the medical sciences.

212 **Neurobiology** (3) (Same as Phyl 212) Staff

An integrated survey of the structure and function of the human nervous system; lecture, clinical demonstration, and laboratory. Laboratory fee, $25.

221–22 **Seminar** (1–1) Koering

Research reports and discussions of special topics by staff and students. (Academic year)

249 **Introduction to Anatomical Research** (1) Staff

Major research techniques as applied to bilogical materials in the various anatomical disciplines. (Fall)

252 **Physical Anthropology** (1) Angel

Variations in man and factors affecting him, human evolution and racial differences, anatomy and culture of ancient man. (Spring)

254 **Fetal Anatomy** (2) Allan

Dissection of early and late human fetus. Comparison of fetal and adult structures. 20 students. Laboratory fee, $10. (Spring)

256 **Human Genetics** (1) C. B. Jacobson

General principles of genetics, new cytogenetics techniques, aneuploidy in man and its significance, biochemical aspects of heredity, genetic counseling. (Spring)

258 **Cytology** (3) Albert and Staff

(Formerly Cell Biology)
Detailed study of morphology and function of the cell and its organelles. Basic cytological techniques emphasized. Laboratory fee, $20. (Spring)

260 **Electron Microscopy in Cellular Biology—Lecture** (1) Koering
Introduction to the morphology of the cell and its components. (Spring)

261 **Electron Microscopy in Cellular Biology—Laboratory** (2) Koering
Introduction to the routine processing of specimens; preparation and interpretation of micrographs. Limited enrollment. Admission by permission of instructor. Prerequisite or concurrent registration: Anat 260. Laboratory fee, $15. (Spring)

262 **Gross Anatomy of Upper and Lower Extremities** (2) Snell and Staff
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, $10. (Spring)

264 **Gross Anatomy of Head and Neck** (2) Snell
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, $10. (Spring)

266 **Gross Anatomy of Thorax and Abdomen** (2) Snell
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, $10. (Spring)

268 **Gross Anatomy of Pelvis, Perineum, and Lower Extremity** (2) Snell and Staff
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, $10. (Spring)

270 **Dissection of the Human Brain** (1) Johnson
Dissection of major pathways and nuclei of the brain with consideration of ventricular system; conferences and assigned reading. Limited enrollment. Laboratory fee, $10. (Spring)

272 **Autonomic Nervous System** (1) Allan
Development, microscopic and gross anatomy, function of central and peripheral components of autonomic nervous system. (Spring)

276 **Advanced Studies in Anatomy** (1) Staff
Lectures and conferences on selected anatomical subspecialties—endocrinology, teratology, growth, etc. May be repeated for credit. (Spring)

288 **Surface Anatomy and Radiology** (1) Snell
Lectures and demonstrations on areas of clinical importance. (Spring)

295 **Research** (arr.) Staff
Content differs each time course is offered; may be repeated once for credit. Fee to be arranged. (Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Anthropology

Professor R.K. Lewis
Professorial Lecturers J.L. Angel, Ruth McKay
Associate Professors R.L. Humphrey, Jr. (*Chairman*), Ruth Krulfeld, V.K. Golla, Suzanne Simons
Associate Professorial Lecturers A.G. Wright, James Mahoney, Jr.
Assistant Professors Alison Brooks, Jane Pires-Ferreira (*Research*)
Assistant Professorial Lecturer George Stuart
Lecturer Carolyn Rose

Bachelor of Arts with a major in Anthropology (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite course—Anth 1–2.
3. Required courses in other areas—(a) 12 semester hours, or equivalent, of introductory French, German, Russian, or Spanish (or another major language approved by the Department of Anthropology); (b) 6 to 12 semester hours of course work in related departments. Recommended for ethnological emphasis are courses in Economics, Political Science, Psychology, and Sociology; for archaeological emphasis, courses in American Civilization, Art History, Geography and Regional Science, Geology, and History; for emphasis in physical anthropology, courses in Anatomy and Biological Sciences. Statistics is strongly recommended for all Anthropology majors.
4. Requirements for the major—24 to 36 semester hours in second-group Anthropology courses, including Anth 192 and courses in each of the following categories: Aspects of Culture (courses numbered in the 150's), Linguistics (courses numbered in the 160's), Ethnology (courses numbered in the 170's), and Physical Anthropology or Archaeology (courses numbered in the 180's). Qualified seniors may enroll in 200-level courses with permission of the instructor. Up to 6 semester hours of ethnographic or archaeological field school credit may be accepted and applied toward the major with the approval of the Department, and majors are encouraged to participate in such summer programs offered here or elsewhere. Opportunities for field and laboratory research participation are also periodically available to exceptionally able students both with staff members conducting research and at one of the several excellent anthropological museum facilities in the area. Credit for such work may be granted through registration for Anth 195.

Bachelor of Arts with a major in Classical Archaeology and Anthropology (Departmental).—An interdepartmental major offered by the departments of Anthropology and Art. The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult a departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Natural and Mathematical Sciences.)
2. Prerequisite course—Anth 1–2.
3. Required courses in the major—Anth 152, 158, 177, 183; Art 101, 102, 103, 111; Hist 109, 110. (A reading knowledge of French and German is recommended.)

Master of Arts in the field of Anthropology.—Prerequisite: a Bachelor of Arts degree with a major in Anthropology from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. The minimum requirement consists of 24 semester hours of Anthropology courses plus a thesis (equivalent to 6 semester hours). A thesis is preferred; however, under certain circumstances, with the approval of the Department, students may elect a program of study consisting of 36 semester hours of Anthropology courses without a thesis. There are no specific required courses; however, the student's program must cover the major areas of anthropological interest which have been approved in advance by the Department graduate adviser. A reading knowledge examination in one foreign language must be passed before beginning the third semester of graduate work. (A tool requirement in Statistics may be substituted for the foreign language reading examination with the approval of the Department.) Students who are writing a thesis must take the Master's Comprehensive Examination before registration for the second half of thesis work.

A specialized program in Anthropological Museology, including research at the Smithsonian Institution and a limited number of internships at the Textile Museum, is available to selected students.

Master of Arts in Special Studies in the field of Anthropology with a concentration in Ethnographic Conservation (offered in cooperation with the Department of Art).—Prerequisite: a Bachelor of Arts degree with a major in Anthropology from this University, or an equivalent degree, or a Bachelor of Arts degree with a major in Art History and additional background in Anthropology.

Required: the general requirements, pages 93–100. A minimum of 36 semester hours is required, at least 18 in Anthropology and at least 18 in Art History. There is no tool requirement. Students must also take Chem 13 unless they have equivalent undergraduate preparation. Twelve semester hours must be taken in the Anthropology Conservation Laboratory at the Smithsonian Institution: Anth 290 (repeated once for credit); and Art 201–2 or 271–72; permission to take these courses must be obtained from the supervisor of the laboratory prior to beginning the program of study. Additional required courses include Art 292 and 293 and 12 semester hours selected from Anth 264, 266, 270, 291; Art 248, 261, 284.

Departmental prerequisite: Anth 1–2 is prerequisite to all other courses in Anthropology. This prerequisite may be waived by permission of instructor.

FIRST GROUP

1–2 **Introductory Anthropology (3–3)** Staff

Anth 1: survey of man's origin, physical evolution, and culture history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior. (Anth 1 and 2—fall and spring)

SECOND GROUP

150 **Comparative Value Systems (3)** Krulfeld

Examination of world views, conceptual systems, and value orientations of representative cultures throughout the world. (Spring 1977 and alternate springs)

151 **Primitive Economics (3)** Krulfeld

Comparative study of various economic organizations, including hunters and gatherers, herders and cultivators. (Spring 1977 and alternate springs)

152 **Man, Culture, and Environment** (3) Humphrey

Basic principles of cultural ecology. Man's interaction with the ecosystem both past and present; emphasis on the application of anthropological precepts to current environmental problems. (Spring 1977 and alternate springs)

153 **Psychological Anthropology** (3) McKay

Relevance of psychological theories to human evolution and the cross-cultural study of personality. Cultural determinants of personality formation and mental health. (Fall)

154 **Mythology and Folklore** (3) Golla

Traditional verbal expression of supernatural or social beliefs; metaphorical thought; verbal art. (Fall)

155 **Primitive Religion** (3) Simons, Golla

Conceptions of the supernatural in nonliterate societies. Examination of religious beliefs and practices. Emphasis on religious process and change. (Spring)

156 **Comparative Political and Legal Systems** (3) Simons

Cross-cultural study of ancient and modern systems of social control; moral, ethical, and legal factors which operate to produce behavioral norms. (Spring)

157 **Primitive Social Organization** (3) Simons

The analysis of the social organization of primitive peoples; kinship, economic, and political systems. (Fall)

158 **Art and Culture** (3) Krulfeld

Study of the art of tribal society, including the role of art in culture, influences upon the artist, and beliefs and practices associated with art production. (Fall or spring)

159 **Ethnography of Knowledge** (3) Golla

The organization of empirical knowledge in literate and nonliterate societies. Processes of hypothesis, deduction, and classification. (Fall 1975 and alternate falls)

161 **Language and Culture** (3) Golla

Structure and semantics of systems of human communication; linguistic change; social aspects of language. (Fall)

162 **Linguistics in Anthropology** (3) Golla

Introduction to general (descriptive and comparative) linguistics. (Spring)

170 **Cultures of the Caribbean** (3) Lewis

Study of the culture history and ways of life of the various cultural groups of the area up to the ethnographic present. (Spring 1976 and alternate springs)

171 **Native Peoples of North America** (3) Simons, Humphrey

Comparative study of Indian groups representative of each of the culture areas of the continent. (Fall)

172 **Native Peoples of South America** (3) Stuart

Survey of Indian groups representative of each of the culture areas of the continent. Hacienda, plantation, and urban adaptations of Indian and African groups. (Fall 1976 and alternate falls)

173 **Cultures of the Pacific** (3) Lewis

Study of the culture history and ways of life of the native peoples of Melanesia, Micronesia, and Polynesia. (Fall 1976 and alternate falls)

174 **Far Eastern Communities** (3) Krulfeld

Study of social organizations, religions, economies, and problems of current anthropological interest for cultures of the Far East, including Japan, Korean, China, and India. (Fall 1976 and alternate falls)

175 **Cultures of Southeast Asia** (3) Krulfeld

Study of representative Southeast Asian cultures from nonliterate societies to high civilizations. (Fall 1975 and alternate falls)

176 **Cultures of the Circumpolar Region** (3) Humphrey

Survey of the social and economic adaptations to an extreme climate made by peoples of the northern subarctic and arctic regions of North America and Eurasia. (Spring)

177 **Cultures of the Near East** (3) Lewis

Study of the geographic environment, language, religion, and social structure of settled and nomadic peoples of the Near East; emphasis on the Arab world. (Spring 1977 and alternate springs)

178 **Cultures of South and East Africa** (3) Lewis

Comparative examination of the history, cultural development, and contemporary problems of cultures of southern and eastern Negro Africa. (Fall 1975 and alternate falls)

179 **Cultures of West and Central Africa** (3) Lewis

Comparative examination of the history, cultural development, and contemporary problems of cultures of western and central Negro Africa. (Spring 1976 and alternate springs)

182 **New World Archaeology** (3) Humphrey

Introduction to archaeological methodology, theory, and survey of North American culture history from man's entry into the Americas during the Pleistocene period until the time of the first European contacts. (Spring)

183 **Old World Prehistory** (3) Brooks

Specific area and periods to be announced in the *Schedule of Classes*. Survey of human prehistory in Europe, Africa, and Asia from the earliest hominid cultures to the beginnings of advanced civilizations and their secondary centers. May be repeated for credit with permission of instructor. (Fall)

184 **Ethnohistory** (3) Stuart

Cultural reconstruction of behavioral and ideological patterns of past societies. Specific cultural area to be announced in the *Schedule of Classes*. (Spring)

185 **Latin American Archaeology** (3) Humphrey, Stuart

The culture history of pre-Columbian Latin America from the Paleo-Indian period through the Spanish Conquest, emphasizing the origin and development of Latin American high civilizations. Spring 1977 and alternate springs)

186 **Physical Anthropology of Modern Man** (3) Angel

Individual and social biology, methods and techniques. Genetic, cultural, and ecologic backgrounds of individual and population variation: micro-evolution, growth, paleodemography, paleopathology, forensic identification techniques. (Spring)

187 **Introduction to Hominid Evolution** (3) Brooks

The fossil record of hominid evolution considered in the light of evolutionary theory. Brief review of the earlier antecedents of man, with concentration on the Pleistocene remains. (Spring 1977 and alternate springs)

188 **Primatology** (3) Brooks

Physical and behavioral characteristics of the various primate groups and their relationship to human physical and cultural evolution. Frequent meetings at the National Zoological Park. (Fall 1975 and alternate falls)

192 **Anthropological Theory** (3) Krulfeld, Brooks

Analysis of the theoretical postulates and assumptions underlying the development of modern cultural anthropology. (Fall and spring)

193 **Anthropological Methods** (3) Krulfeld, Lewis

Approaches to library and field research. Conceptual bases and bias in the delineation of problems; in the selection, analysis, and organization of data; and in the preparation of the final report. (Spring 1977 and alternate springs)

195 **Undergraduate Research** (arr.) Staff

Individual research problems. May be repeated for credit. (Fall or spring)

THIRD GROUP

202 **Seminar: Recent Trends in Anthropology** (3) Krulfeld

Major topics of interest in contemporary anthropology since the mid-20th century will be taken up in order, stressing current journal and monograph materials. (Spring 1977 and alternate springs)

*215 **Field Methods in Cultural Ecology: Pre-Columbian Settlement Patterns in the Tehuacan Valley** (6) Humphrey, Langran

Field and laboratory examination of settlement patterns and sociopolitical structures in pre-Columbian Mesoamerica and their relationship to agricultural water-control systems. (Summer)

254 **Seminar: Folklore in America** (6) Golla

Intensive seminar covering the various aspects of American traditional culture, including the theory and methodology of folklore research. Primary emphasis on Anglo- and Afro-American traditional cultures, with some consideration of other ethnic groups. (Summer)

261 **Seminar: Anthropological Linguistics** (3) Golla

Anthropological study of language—dialectology, ethnosemantics, descriptive and comparative studies of exotic languages. (Spring)

262 **Seminar: Applied Anthropology** (3) Lewis, McKay

Use of anthropological methods and techniques in such specific fields as government, community development, land reform, law, and medicine. (Fall)

263 **Seminar: Culture Contact and Change** (3) Simons

Change in Western and non-Western cultures; emphasis on general processes of change and interaction between simpler and more complex societies. (Fall)

264 **Seminar: Museum Techniques** (3) Humphrey

Principles of anthropological collection, classification, preservation, identification, interpretation, and exhibition of specimens; research and instructional use of the museum. Field trips to area museums. (Fall)

265 **Seminar: Method and Theory in Archaeology** (3) Humphrey, Brooks

Analysis of field techniques, dating methods, and theoretical approaches in reconstructing and interpreting the cultures of the past, utilizing the most recent archaeological techniques. (Spring)

266 **Seminar: Technology** (3) Humphrey, Lewis

Cross-cultural examination of the form, function, meaning, and use of material culture and the behavior patterns involved in its production. (Spring 1977 and alternate springs)

267 **Seminar: Economic Anthropology** (3) Krulfeld

Comparative study of systems of production, distribution, and consumption. (Fall)

268 **Seminar: Peasant Society** (3) Krulfeld

Cross-cultural analysis of peasant societies, including an examination of their manner of functioning within their larger social, economic, and cultural context. (Fall)

*Interdepartmental course offered by the departments of Anthropology and Geography and Regional Science.

269 **Seminar: Structural Problems** (3) Simons

Comparative survey of principles of descent, kinship terminology, and formation of descent groups; problems of variation and change in kinship systems and development of kinship models. (Spring)

*270 **Seminar: Museum Exhibiting** (3) Mahoney

Selected museum exhibiting problems in the social and natural sciences including methods and techniques of exhibition, problems of museum communication, education, etc. Taught at the Smithsonian Institution. (Fall)

272 **Seminar: Topics in Latin American Anthropology** (3) Staff

Research topic selected from among peasant movements, ethnic groups, land reform, urbanization, archaeological problems. (Spring)

273 **Seminar: Urban Anthropology** (3) McKay

Anthropological investigations of city life from Neolithic beginning to the present. Study of occupational, class, and ethnic communities within cities as well as ethnographies of entire cities. Adaptation of traditional field methods to urban settings. (Spring)

274 **Seminar: Afro-American Culture** (3) McKay

An ethnographic survey of racial, linguistic, and cultural attributes of Americans of African ancestry. African antecedents, conditions of migration, experiences in slave and free communities over their 350-year history in the United States. (Spring 1976 and alternate springs)

282 **Seminar: Advanced Archaeology—North American Prehistory** (3) Humphrey, Stuart

Analysis in depth of current archaeological problems relating to the origin and development of aboriginal cultures. Specific topic to be announced in the *Schedule of Classes*. (Fall)

283 **Seminar: Topics in Old World Anthropology—Physical Anthropology and Archaeology** (3) Brooks

Study of current problems in relation to materials from the old world. Specific area to be announced in the *Schedule of Classes*. (Spring 19— and alternate springs)

287 **Seminar: Problems in Latin American Civilization** (3) Staff

Interdisciplinary seminar partially guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspects of a selected key theme. Admission by permission of instructor. (Spring)

290 **Advanced Museum Research** (3) Staff

Supervised individual research and/or field work at the Smithsonian Institution, arranged in consultation with the Smithsonian and the Department of Anthropology. Admission by permission of the Chairman of the Department. May be repeated for credit. (Fall and spring)

* Joint offering of the Department of Anthropology and the American Studies Program.

291 **Seminar: Museology** (3) Wright

Twentieth century development of museums—natural history, science, and history; their history, philosophy, and organization; their civic importance and administrative problems. (Spring)

*292 **Introduction to Conservation** (3) Rose

Method and theory of conservation, including fine arts, ethnographic archaeological and monuments conservation; handling, restoration, preservation, storage, and display of museum specimens; basic materials of ethnographic objects and the ways they react to their environment. (Fall)

*293 **Conservation Laboratory Techniques** (3) Rose

Examination procedures and analytical techniques used in the conservation laboratory, including discussion of chemical composition of solvents, adhesives, coating, and filling materials used in the restoration and stabilization of museum specimens. Prerequisite: Anth 292, Chem 13. Taught at the Smithsonian Conservation Laboratory. (Spring)

†294 **Field Research in Historical Archaeology** (3)

Field techniques, including excavation, recording, photography, preservation, laboratory analysis and interpretation, supplemented by seminars on the history, ethnography, and ethnohistory of 17th century St. Mary's City, Md.

295 **Research** (arr.) Staff

May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

Art

Professors W.A. MacDonald (*Chairman*), L.P. Leite (*Emeritus*), F.S. Grubar
Professorial Lecturers Grace Evans, John Shapley
Associate Professor D.H. Teller
Adjunct Associate Professor Grose Evans
Assistant Professors H.I. Gates, Lilien Robinson, W.T. Woodward, Fuller Griffith, J.F. Wright, Jr., J.L. Lake, Pamela Hoyle (*Visiting*), A.H. Smith (*Visiting*), Türker Özdogan
Assistant Professorial Lecturer E.L. Battaglia
Lecturer Carolyn Rose
Special Lecturer Lillian Miller

* Interdepartmental course offered by the departments of Anthropology and Art.
† Joint offering of the Department of Anthropology and the American Studies Program, in cooperation with St. Mary's College, the Smithsonian Institution, and the St. Mary's (Md.) City Commission.

Faculty of the Corcoran School of Art: Roy Slade (*Dean*), Peter Thomas (*Assistant Dean*), Leon Berkowitz, Joe Cameron, William Christenberry, Terry Dale, Gene Davis, Michael Day, William Dutterer, Mary Beth Edelson, Eugene Frederick, Gary Glover, Tom Green, Samuel Holvey, Andrew Hudson, Paul Kennedy, Blaine Larson, William Lombardo, Ed McGowin, Michael Mitchell, Christopher Muhlert, Robert Newmann, Jack Perlmutter, Fred Pitts, Mark Power, Barbara Price, Kywal Ramkissoon, Paul Reed, Berthold Schumtzhart, Rona Slade, Robert Stackhouse, A. Brockie Stevenson, Joseph Taney, Elliott Thompson, Walter Urie

Bachelor of Arts with a major in Art History (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)

2. Prerequisite courses—Art 31–32 or 71–72.

3. Required courses in related areas—Art 137; Fren 1–2, 3–4, or Germ 1–2, 3–4; Phil 162; or equivalent. (A reading knowledge of French or German should be acquired as soon as possible. Students who plan to do advanced work in Classical Archaeology or Medieval Art are also advised to study Greek and Latin.)

4. Required courses in the major—Art 101 or 102, 104 or 105, 108, 109, 110, 112, 113 or 114, 117 or 118; 12 additional semester hours in second-group Art History courses.

5. A maximum of 9 semester hours in Fine Arts, including Art 137, is permitted.

Art History majors may apply for graduation with Special Honors. In order to be accepted into this program, students must satisfy the general requirements (pages 50–51). They should apply in writing to the Chairman of the Department of Art at the beginning of their senior year. Before admittance to the program, they must pass a reading examination administered by the Department in either French or German. Upon acceptance, candidates will be assigned to one or more faculty advisers under whose direction they will undertake a supervised program of selected reading on which they will be required to submit written, critical reports.

The Department of Art has established a program of study in affiliation with area private art galleries. This program is open to a limited number of qualified undergraduate students. For details, consult the Chairman of the Department of Art.

Bachelor of Arts with a major in Fine Arts (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)

2. Prerequisite courses—Art 21–22, 41–42 (students concentrating in photography substitute Art 23–24 for 41–42).

3. Required courses in related areas—Art 31–32 or 71–72; 6 additional semester hours in second-group Art History courses.

4. Required courses in the major—27 semester hours of first- or second-group Fine Arts courses in seven areas—Ceramics, Design, Drawing, Graphics, Painting, Photography, and Sculpture. Students choose one of these areas as a primary area of concentration, in which 12 semester hours are required. The remaining 15 semester hours must be distributed among the other areas, but only in the primary area can work taken amount to 12 semester hours. (Transfer students must take at least 12 semester hours of second-group Fine Arts courses in residence at this University no matter how much advanced standing in Fine Arts is granted upon admission.)

Fine Arts seniors may apply for graduation with Special Honors. In order to be accepted into this program, the student must satisfy the general requirements (see pages 50–51). They should apply in writing to the Chairman of the Department of Art at the beginning of their senior year. Upon acceptance, each candidate will be assigned one or more faculty advisers under whose direction he will complete a project in his special area of interest. Upon completion of the project, the student will present a one-man exhibit prepared exclusively outside of class, subject to the examination of an Honors Board.

Bachelor of Arts with a major in Classical Archaeology and Anthropology (Departmental).—An interdepartmental major offered by the departments of Art and Anthropology. The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult a departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Natural and Mathematical Sciences.)
2. Prerequisite course—Anth 1–2.
3. Required courses in the major—Anth 152, 158, 177, 183; Art 101, 102, 103, 111; Hist 109, 110. (A reading knowledge of French and German is recommended.)

Bachelor of Arts with a major in Classical Archaeology and Classics (Departmental).—An interdepartmental major offered by the departments of Art and Classics. The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult a departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Natural and Mathematical Sciences.)
2. Prerequisite courses—Clas 1–2, 3, 4; or Clas 11–12, 13–14.
3. Required courses in the major—Art 101, 102, 103, 111; Hist 109, 110; 14 semester hours of second-group courses in Greek or Latin, including Clas 138. (A reading knowledge of French and German is recommended.)

Master of Arts in the field of Art History.—Prerequisite: a Bachelor of Arts degree with a major in Art History from this University, or an equivalent degree. Applicants from other institutions must present scores on the Graduate Record Examination to the Office of the Graduate School of Arts and Sciences.

1. *With a concentration in Classical Art and Archaeology, American Art, Renaissance and Baroque Art,* and *Contemporary Art.*—Required: the general requirements, pages 93–100. As many as possible of the 24 semester hours of course work should be third-group courses. The courses must be completed in 6 semesters or less, with a grade of *A* in at least 6 semester hours of work, and with an overall quality-point index of at least 3.25. A reading knowledge examination, preferably in German or French, must be passed after completing 9 semester hours of course work. A general written Master's Comprehensive Examination on the problems in the field of Art History and a written thesis (equivalent to 6 semester hours) embodying the result of research on some specific topic in the history and theory of art are also required. For details, consult the Chairman of the Department of Art.

2. *With a concentration in Museum Training.*—Required: the general requirements, pages 93–100. The program of study consists of 36 semester hours of work as follows: 12 hours of Art History courses (taken before acceptance to degree candidacy, see below); Art 201–2, 271–72; and 12 additional hours of Art History courses selected in consultation with the adviser. Grades of *A* are required in at least two courses, and an overall quality-point index of at least 3.25 must be maintained. A reading knowledge examination, preferable in German or French, must be passed after completion of 9 semester hours of course work. For details, consult the Chairman of the Department of Art.

Acceptance in this degree program as a *degree candidate* is provisional, pending the satisfactory completion of 12 semester hours of graduate Art History courses (this requirement will be counted toward the total semester hours required for the degree). Upon completion of these courses the student must make formal application in writing for *degree candidacy* to the joint George Washington University-

National Collection of Fine Arts Committee on Museum Training. The application should state the reasons and aims for seeking this degree, and the student should submit letters of recommendation with the application. A personal interview will also be required.

The Department of Art also has established a program of study in affiliation with the Textile Museum, the Corcoran Gallery of Art, the African Museum, and area private art galleries. Students wishing to earn graduate credit in this program should consult the Chairman of the Department of Art.

Master of Arts in the field of Classical Archaeology, Classics, and History (an interdepartmental degree program offered by the departments of Art, Classics, and History).—Prerequisite: A Bachelor's degree with a background in Classical Archeology and either Greek or Latin. Applicants from other institutions must present scores on the Graduate Record Examination to the Office of the Graduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. The program of study consists of 24 semester hours of course work (as many as possible should be third-group courses) selected in consultation with the appropriate adviser from the departments of Art, Classics, and History; plus a thesis (equivalent to 6 additional semester hours). Candidates must pass a reading knowledge examination in French or German. All candidates are required to pass a general Master's Comprehensive Examination.

Master of Arts in Special Studies with a concentration in Ethnographic Conservation.—An interdepartmental program offered by the departments of Anthropology and Art History. Required: the general requirements, pages 93–100. The program of study consists of 36 semester hours as follows: a minimum of 18 hours in Anthropology and a minimum of 18 hours in Art History. Twelve of the 36 hours must be taken in the Anthropology Conservation Laboratory at the Smithsonian Institution. The courses for this laboratory are Anth 290, Art 201–2, and/or Art 271–72, and the work requires 20 hours a week for four semesters. Admission to the laboratory courses requires the permission of the Supervisor of the Anthropology Conservation Laboratory and must be obtained prior to beginning the program of studies. Required courses include Anth 292 and 293, or Art 292 and 293; Chem 13 or equivalent; and at least four of the following: Anth 264, 266, 270, 291, Art 248, 261, or 284.

Master of Fine Arts in the field of Ceramics, Design, Graphics, Painting, Photography, or *Sculpture.*—Prerequisite: a Bachelor of Arts degree with a major in Fine Arts in the field of Ceramics, Design, Drawing, Graphics, Painting, Photography, or Sculpture from this University, or an equivalent degree. Students planning to do graduate work in the field of Graphics or Painting must have 12 semester hours of Drawing on the undergraduate level prior to admittance to the Master's degree program.

Required: the general requirements, pages 93–100. In lieu of the foreign language requirement, Master of Fine Arts candidates are required to take 3 additional hours of course work in consultation with the adviser; as many as possible of the remaining 24 hours of course work should be in third-group courses, only 18 hours of which may be in one area, the remaining 6 to be selected from related areas in consultation with the adviser. A creative thesis (equivalent to 6 semester hours) in ceramics, design, graphics, painting, photography, or sculpture, and a paper discussing some technical phase of the problem illustrated by the thesis are also required. A representative portion of the work illustrating the creative thesis may be retained by the University at the discretion of the thesis director in agreement with the second reader. For details, consult the Chairman of the Department of Art.

Doctor of Philosophy in the field of Art History.—Required: the general requirements, pages 93–97, 100–102. Candidates must also pass written examinations in French and German or any other appropriate foreign language, a General Examination in Art History, an examination in the area of specialization, and examinations in

o areas related to the area of specialization. Each student plans his program in nsultation with a departmental committee.

Areas of Specialization: Classical Art and Archaeology, Renaissance Art, Baroque rt, Eighteenth Century Art, Nineteenth Century Art, Twentieth Century Art, and merican Art.

Bachelor of Arts in Education with a teaching field in Art.—Prerequisite: the ducation curriculum, page 79.

Required: the Art option and professional courses listed on pages 111–12, 120–21.

RT HISTORY

IRST GROUP

31–32 **Survey of Western Art** (3–3) Robinson and Staff

Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art. Art 31: Prehistoric to Gothic art. Art 32: proto-Renaissance to contemporary art. (Art 31 and 32—fall and spring)

71–72 **Introduction to the Arts in America** (3–3) Grubar and Staff

Painting, sculpture, and architecture of America, with selected references to crafts and popular arts. Art 71; from Colonial beginnings to the Republican Age. Art 72: from 19th century to the present. (Art 71 and 72—fall and spring)

ECOND GROUP

101 **Greek Architecture** (3) MacDonald

(Fall)

102 **Greek and Roman Sculpture** (3) MacDonald

(Spring)

103 **Classical Iconography** (3) MacDonald

Origin and development of myths in classical art.

104 **Renaissance Art in Italy I** (3) Grace Evans, Leite

Early developments from the 13th to the 15th century. (Fall)

105 **Renaissance Art in Italy II** (3) Grace Evans, Leite

High Renaissance and Mannerism. (Spring)

106 **Renaissance Art in the North I** (3) Staff

Fifteenth century painting in the Netherlands, Germany, France, and Spain. (Fall)

107 **Renaissance Art in the North II** (3) Staff

Sixteenth century painting in the Netherlands, Germany, France, and Spain. (Spring)

108 **18th Century Art in Europe** (3) Staff

Development of painting, sculpture, and architecture. (Spring)

109 **19th Century Art in Europe** (3) Leite, Robinson
Painting and sculpture. (Fall and spring)

110 **Contemporary Art** (3) Leite, Robinson
Painting and sculpture in 20th century Europe. (Fall and spring)

111 **Classical Archaeology** (3) MacDonald
Archaeological monuments of classical civilizations, with intensive study of one or more areas selected from architecture, sculpture, painting, or minor arts.

112 **Art of Egypt and the Ancient Orient** (3) MacDonald
Study of the art of Mesopotamia, Anatolia, Egypt, and Persia. (Spring)

113 **Baroque Art in Italy** (3) Grose Evans, Leite
Development of painting, sculpture, and architecture in 16th and 17th century Italy. (Spring)

114 **Baroque Art in the North** (3) Staal
Development of painting, sculpture, and architecture in the 16th and 17th centuries in Holland, Flanders, Spain, France, Germany, and England. (Fall)

115 **Christian Iconography** (3) Leite
Origins and development of Christian symbols and themes from early Christian to modern times.

116 **Islamic Art** (3) Shapell

117 **Medieval Art I** (3) Grace Evans
Architecture, sculpture, and painting of the early Christian and Byzantine periods. (Fall)

118 **Medieval Art II** (3) Grace Evans
Architecture, sculpture, and painting of the Romanesque and Gothic periods. (Spring)

119 **Pre-Romanesque Art in the North** (3) Grace Evans, Klinger
The Merovingian and Carolingian periods. (Spring)

120 **Art of China and Japan** (3) Klinger
Architecture, painting, and sculpture of China, Korea, and Japan. (Fall)

145 **Folk Arts in America** (3) Lawson
Ceramics, woodcarving, ironwork, decorative painting, weaving, and other crafts. (Fall)

146 **Principles of Museum Work** (3)
Introduction to the history and development of museums; problems of museum administration, connoisseurship, cataloguing, installation, conservation, and educational service. (Fall and spring)

147 **Pre-Columbian Art** (3) — Staff

148 **19th Century American Painting** (3) — Grubar, Grose Evans
(Fall)

149 **19th Century American Sculpture** (3) — Grubar
(Spring)

155 **Etruscan Art and Archaeology** (6) — MacDonald
Offered off campus through the College of General Studies.

IRD GROUP

201–2 **Museum Projects** (3–3) — Staff
Open only to candidates for the degree of Master of Arts in the fields of Museum Training and Ethnographic Conservation. Practical work to be determined by Museum Training Committees at the institutions involved. (Academic year)

*203 **Primitive Art** (3) — Kline
Arts of prehistoric and primitive man in Europe, the pre-Columbian Americas, Oceania, and Africa. (Spring)

*207 **Modern Architecture** (3) — Kline
Development of modern architecture and building technology in Europe and America from the late 19th century to the present. (Fall)

216 **Medieval Painting** (3) — Grace Evans
Painting and the decorative arts.

†220 **Seminar: Baroque Art of the 17th Century** (3) — Leite
Specific area announced in *Schedule of Classes*. A reading knowledge of Italian is desirable for the Italian area and German for the northern area. (Spring)

†221 **Seminar: Renaissance Art** (3) — Leite
Specific area announced in *Schedule of Classes*. A reading knowledge of French, German, or Italian is desirable, depending on the specific area. (Fall and spring)

242 **Etruscan Art and Archaeology** (6) — MacDonald
Offered off campus through the College of General Studies.

†243 **Seminar: American Art** (3) — Grubar
Specific area announced in *Schedule of Classes*. (Fall and spring)

244 **Seminar: 19th Century European Art** (3) — Leite
Specific area announced in *Schedule of Classes*. Reading knowledge of French desirable.

* May be taken for undergraduate credit with the approval of the instructor.
† May be repeated for credit if the specific area covered is different.

245 **Seminar: 20th Century European Art** (3) Leite
Specific area announced in *Schedule of Classes.*

246 **Seminar: Classical Art** (3) MacDonald
Specific area announced in *Schedule of Classes.*

247 **Seminar: Medieval Art** (3) Grace Evans
Specific area announced in *Schedule of Classes.*

248 **Independent Research in Art History** (3)
For Master's degree candidates; open to limited number of qualified undergraduates, with permission. Independent research arranged in consultation with individual instructor and graduate adviser. May be repeated for credit. (Fall and spring)

261 **Seminar: Problems in Art History** (3) Staff
Recommended for Art History majors; open to limited number of qualified undergraduates, with permission of instructor. Theory, criticism, or methodology of art history. May be repeated for credit. Topic to be announced in *Schedule of Classes.* (Fall and spring)

271–72 **Museum Techniques** (3–3) Staff
Open only to candidates for the degree of Master of Arts in the fields of Museum Training and Ethnographic Conservation. Practical work to be determined by Museum Training Committees at the institutions involved. (Academic year)

*284 **Seminar: Studies in American Art and History** (3) Miller
Exploration of selected problems and themes in American cultural history involving the use of artistic materials in different media; emphasis on methodology and analytic techniques. (Spring)

289–90 **Thesis Research** (3–3) Staff
(Fall and spring)

†292 **Introduction to Conservation** (3) Rose
Method and theory of conservation, including fine arts, ethnographic, archaeological and monuments conservation; handling, restoration, preservation, storage, and display of museum specimens; basic materials of ethnographic objects and the ways they react to their environment. (Fall)

†293 **Conservation Laboratory Techniques** (3) Rose
Examination procedures and analytical techniques used in the conservation laboratory, including discussion of chemical composition of solvents, adhesives, coating, and filling materials used in the restoration and stabilization of museum specimens. Taught at the Smithsonian Conservation Laboratory. Prerequisite: Anth 292, Chem 13. (Spring)

* Joint offering of the Department of Art and the American Studies Program in affiliation with the National Portrait Gallery of the Smithsonian Institution.
† Interdepartmental course offered by the departments of Art and Anthropology.

INE ARTS

nless otherwise indicated, Fine Arts courses taught in University studios carry no aterial or laboratory fees; students must purchase their own materials. Laboratory and material fees for courses taught at the Corcoran School of Art (CSA) are ated in the course description and are payable at the School.

Courses taught at the Corcoran School of Art have the designation "Corcoran aculty" for the instructor.

Departmental prerequisite: Art 21–22 and 41–42 (students concentrating in photography substitute Art 23–24 for 41–42) or permission of Department Chairman is erequisite to all other studio courses in Art.

IRST GROUP

***21–22 Design I: Basic (3–3)** — Staff

Fundamental studies of principles and elements of design. Art 21: study of two-dimensional design. Art 22: three-dimensional studies. Art 21: Laboratory fee, $10. Art 22: Laboratory fee, $15. (Art 21 and 22—fall and spring)

23–24 Fundamentals of Photography (3–3) — Lake, Corcoran Faculty

Fundamental techniques of photography; emphasis on creative expression. Laboratory fee, $30 a semester. (Art 23 and 24—fall and spring)

41–42 Drawing I (3–3) — Wright, Corcoran Faculty

Concepts of drawing, traditional and contemporary; training in perception, analysis of form, use of media, and exercises in connoisseurship. Material and model fee when taught on GWU campus, $15 a semester. (Art 41 and 42—fall and spring)

51–52 Ceramics I (3–3) — Özdogan, Corcoran Faculty

Working with clay as an art form. Basic techniques of hand building and wheel throwing. Laboratory fee, $45 a semester. (Academic year)

57–58 Graphics I (3–3) — Griffith, Wright

Exploration of the methods of intaglio, relief, printing, and other composite processes. Material fee, $20 a semester. (Academic year)

61–62 Water Color (3–3) — Corcoran Faculty

Painting in transparent and opaque water color and in acrylic. Experimentation, figurative and landscape. (Academic year)

65–66 Painting I (3–3) — Corcoran Faculty

Emphasis on personal expression with exposure to a variety of styles and attitudes. Use of acrylic and oil. (Academic year)

81–82 Sculpture I (3–3) — Gates, Corcoran Faculty

Three-dimensional design. Basic sculptural techniques: modeling, carving, and construction. Media include wood, clay, stone, plaster. Laboratory fee: when taught on GWU campus, $15 a semester; when taught at CSA, $25 a semester. (Academic year)

* Required of all Fine Arts majors.

SECOND GROUP

Second-group Art courses may be repeated for credit with approval of Department.

123–24 **Design II: Individual Problems** (3–3) Staff

Emphasis on the individual student and the problems and materials that specifically interest him in any area of design. (Academic year)

*125–26 **Painting II** (3 or 6–3 or 6) Corcoran Faculty

Emphasis on personal expression; exposure to a variety of styles and attitudes. Materials and techniques subordinate to individual experimentation. Use of acrylic and oil. (Academic year)

*127–28 **Painting III** (3 or 6–3 or 6) Woodward

Exploration of problems in developing a personal visual imagery. Material fee each semester: $12 for 3 semester hours; $24 for 6 semester hours. (Academic year)

*131–32 **Ceramics II** (3 or 6–3 or 6) Özdogan, Corcoran Faculty

Development of techniques with emphasis on quality and creativity. Laboratory fee each semester: $45 for 3 semester hours; $60 for 6 semester hours. (Academic year)

135–36 **Advanced Water Color** (3–3) Corcoran Faculty

Development of techniques of water color; concentration on special projects. (Academic year)

137 **Workshop in Materials, Methods, and Techniques** (3) Woodward

Drawings in charcoal, crayon, and pen; painting and preparation of grounds for tempera, encaustic, fresco buono, oil, water color, polymer and mixed techniques; graphic techniques in woodcut, engraving, etching. Material and model fee, $10. (Fall and spring)

143–44 **Serigraphy** (3–3) Teller

Advanced problems in serigraphy; emphasis on its aesthetic possibilities. Prerequisite: Art 57–58. Laboratory Fee, $15 a semester. (Academic year)

*151–52 **Ceramics III** (3 or 6–3 or 6) Özdogan, Corcoran Faculty

Development of techniques with emphasis on quality and creativity. Students mix own clay and glazes. Laboratory fee each semester: $45 for 3 semester hours; $60 for 6 semester hours. (Academic year)

*153–54 **Graphics II** (3 or 6–3 or 6) Griffith, Wright

Advanced relief, intaglio, and other composite processes. Prerequisite: Art 57–58. Material fee each semester: $20 for 3 semester hours; $40 for 6 semester hours. (Academic year)

*157–58 **Graphics III** (3 or 6–3 or 6) Griffith

Exploration of combined techniques and mixed media. Prerequisite: Art 153–54. Material fee each semester: $20 for 3 semester hours; $40 for 6 semester hours. (Academic year)

* Fine Arts majors and Masters of Fine Arts candidates should elect 6 semester hours of credit.

159–60 **Drawing II** (3–3) Wright, Corcoran Faculty

Development of drawing. Individual study, application and extensions of drawing. Material fee when taught on GWU campus, $20 a semester. (Academic year)

163–64 **Design: Visual Communication** (3–3) Corcoran Faculty

Layouts and execution in client-presentation form of various graphic design projects—brochures, bookjackets, displays, title graphics for film media, etc. Material fee, $20 a semester. (Academic year)

171 **Lettering and Type Form** (3) Corcoran Faculty

(*Formerly Calligraphy*)

Techniques of hand lettering, traditional and contemporary. Exploration of the decorative potential in lettering. (Fall)

172 **Typography I** (3) Corcoran Faculty

Study of type classification, recognition, and adaption. Methods of copy fitting and type reproduction processes. Typographic layout and specification. (Spring)

177–78 **Survey of Printing and Illustration** (3–3) Corcoran Faculty

Exposure of a maximum range of illustrative processes, both practical and theoretical. Technical aspects of commercial printing processes; methods of preparation of artwork, photographs, and typographic proofs for commercial reproduction. (Academic year)

*179–80 **Sculpture II** (3 or 6–3 or 6) Gates, Corcoran Faculty

Concepts of sculpture; new materials and developments. Laboratory fee each semester when taught on GWU campus; $15 for 3 semester hours; $30 for 6 semester hours. Laboratory fee each semester when taught at CSA: $25 for 3 semester hours; $35 for 6 semester hours. (Academic year)

181–82 **Intermediate Photography** (3–3) Lake, Corcoran Faculty

Basic problems. Introduction to color photography with emphasis on creative expression. Prerequisite: Art 23–24 or permission of instructor. Laboratory fee, $30 a semester. (Academic year)

185–86 **Painting and Drawing** (3–3) Corcoran Faculty

Techniques of drawing and painting in oil, acrylic, and water color. Work from life model and still life. (Academic year)

*189–90 **Sculpture III** (3 or 6–3 or 6) Gates

Advanced study concentrating on relevance of scale and media. Relationship of sculpture to the environment. Laboratory fee for each semester: $15 for 3 semester hours; $30 for 6 semester hours. (Academic year)

193–94 **Film Making** (3–3) Corcoran Faculty

(*Formerly Art 193 Film Making [3]*)

Basic techniques and procedures in film making. The student will create

* Fine Arts majors and Masters of Fine Arts candidates should elect 6 semester hours of credit.

his own short film. Art 193 is prerequisite for Art 194. (Academic year)

*195 **Documentary Photography** (3) Lake and Staff

Social problems, team-taught. Each student will work on projects with social dimensions. Laboratory fee, $30. Admission by permission of instructor. Limited enrollment. (Spring)

197–98 **History of Photography** (3–3) Corcoran Faculty

Discussion, with slides of major figures and movements in the history of photography. Art 197: fall; Art 198: spring.

THIRD GROUP

All third-group Art courses may be repeated for credit with the approval of the Department.

205 **Advanced Photography** (3) Lake, Corcoran Faculty

Advanced problems in photography; emphasis on individual development. Prerequisite: Art 181–82 or permisison of instructor. Laboratory fee, $30 a semester. (Fall and spring)

206 **Photography: Special Projects** (3) Lake

Laboratory fee, $30.

208 **Advanced Photography** (3) Corcoran Faculty

Advanced problems in photography; emphasis on individual development. Prerequisite: Art 181–82 or permission of instructor. Laboratory fee, $30. (Fall and spring)

†231–32 **Design III** (3 or 6–3 or 6) Gates

New media and techniques in three-dimensional design. Laboratory fee, $15 a semester for 3 semester hours; $30 a semester for 6 semester hours. (Academic year)

†234 **Design IV** (3 or 6) Staff

Presentation, model building, and specifications of materials in three-dimensional problems. (Fall and spring)

†235 **Design V** (3 or 6) Teller

Designing and executing textiles using the techniques of silk screen, block print, and batik. (Fall and spring)

248 **Independent Research in Fine Arts** (3)

For Master's degree candidates; open to limited number of qualified undergraduates, with permission. Independent research arranged in consultation with individual instructor and graduate adviser. May be repeated for credit. (Fall and spring) Teller

249 **Theory of Design** (3)

Application of design principles to painting, architecture, sculpture, and minor arts of today. Relationship of design principles to the contempo-

* Interdepartmental course offered by the departments of Art and Journalism.

rary artists and his work. Open to undergraduate students with permission of instructor. (Fall)

*251–52 **Ceramics IV** (3 or 6–3 or 6) Özdogan, Corcoran Faculty

Development of techniques with emphasis on quality and creativity. Students mix own clay and glazes. Laboratory fee each semester: $45 for 3 semester hours; $60 for 6 semester hours. (Academic year)

*253 **Ceramics V** (3 or 6) Özdogan, Corcoran Faculty

Laboratory fee: $45 for 3 semester hours; $60 for 6 semester hours. (Fall and spring)

*255–56 **Graphics IV: Serigraphy** (3 or 6–3 or 6) Teller

Prerequisite: Art 157–58. Laboratory fee each semester: $15 for 3 semester hours; $30 for 6 semester hours. (Academic year)

*257–58 **Graphics V: Etching and Engraving** (3 or 6–3 or 6) Griffith

Prerequisite: Art 157–58. Material fee each semester: $20 for 3 semester hours; $40 for 6 semester hours. (Academic year)

*259 **Graphics VI: Lithography** (3 or 6) Wright

(Fall and spring)

*260 **Graphics VII: Relief Printing** (3 or 6) Griffith

Material fee: $20 for 3 semester hours; $40 for 6 semester hours. (Fall and spring)

*265–66 **Painting IV** (3 or 6–3 or 6) Woodward

Creative painting; students work on independent projects as well as assigned problems. Material and model fee each semester: $12 for 3 semester hours; $24 for 6 semester hours. (Academic year)

267–68 **Individual Problems in Photography** (3–3) Lake and Staff

Instruction and professional guidance relevant to individual projects. Laboratory fee, $30 a semester. (Academic year)

*275 **Painting V** (3 or 6) Woodward

(Fall or spring)

277–78 **Design: Advanced Visual Communication** (6–6) Corcoran Faculty

Design and execution of graphic design projects, including magazine spreads, posters, advertisements, trademarks, letterheads, packages. Psychological and symbolic aspects of design solutions. Laboratory fee, $30 each semester. (Academic year)

*279–80 **Sculpture IV** (3 or 6–3 or 6) Gates

Laboratory fee each semester: $15 for 3 semester hours; $30 for 6 semester hours. (Academic year)

* Fine Arts majors and Master of Fine Arts candidates should elect 6 semester hours of credit.

*281 **Sculpture V** (3 or 6) Gates
Laboratory fee: $15 for 3 semester hours; $30 for 6 semester hours.
(Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

Limited to Art History doctoral candidates. Offered as the demand requires.

363–64 **Research Problems** (3–3)
To be arranged with specific institutions, such as National Collection of Fine Arts, Corcoran Gallery, Phillips Gallery, etc. Research is directed to the study of original art works, utilizing staff, documents, and other resources at the respective institutions. May be repeated for credit.

385–86 **Readings in Art History** (3–3)

398 **Advanced Reading and Research** (arr.)
For students preparing for the doctoral examination. May be repeated for credit.

399 **Dissertation Research** (arr.)
May be repeated for credit.

Art Therapy—Graduate Study

Professor B.I. Levy (*Program Director*)
Adjunct Assistant Professors Hanna Kwiatkowska, Elinor Ulman (*Coordinator of Training*)
Assistant Professorial Lecturers Edith Kramer, Mildred Lachman
Clinical Instructors Georgette Powell, Christine Wang

Master of Arts in the field of Art Therapy.—Prerequisite: a Bachelor's degree, evidence of significant training and/or experience in the arts, including painting, drawing, and clay modeling; course work in the behavioral and/or social sciences, including personality theory, abnormal psychology, and child psychology.

Required: the general requirements, pages 93–100. Prospective candidates should consult the brochure which describes the program for specific requirements.

Fields of Emphasis: Adult Art Therapy, Family Art Therapy, Child Art Therapy, and Research.

THIRD GROUP

201 **Introduction to Art Therapy** (3) Ulman
Lectures, presentation of illustrative case material, class discussion of as-

* Fine Arts majors and Master of Fine Arts candidates should elect 6 semester hours of credit.

signed readings. Survey covering range of art therapy practice, diagnostic and treatment approaches, historical development, main theoretical trends. Open only to degree candidates. (Fall)

202 **Case Studies in Art Therapy** (3) Ulman

Discussion of case material provided by students in order to refine methods of working, improve written and oral reports. Instructor and other practitioners may provide supplementary illustrative material. Assigned reading. (Spring)

203 **Technique of Art Therapy** (3) Kwiatkowska

Art therapy approaches with individuals and groups of different diagnostic categories in various settings presented through illustrative clinical examples. Students experiment with numerous techniques through the use of art materials. Open only to degree candidates. (Fall)

204 **The Freudian Model in Art Therapy** (3)
Kramer, Kwiatkowska, Ulman

Concepts of instinctual drives; ego development; defense mechanisms; sublimation; transference and countertransference; maturation and regression applied to work with children, adults, families, and groups. (Spring)

205–6 **Family Art Therapy** (3–3) Kwiatkowska

Principles of family art therapy as adjunctive and primary treatment; art techniques for evaluation of family dynamics. Students participate in working with families. (Academic year)

207–8 **Art as Therapy with Children** (3–3) Kramer

Lectures, presentation of case material, studio work, class discussion of assigned reading. Special considerations of work in art therapy with children will be explored from the theoretical and practical standpoints. (Academic year)

211 **Survey of Art Therapy** (3) Lachman

Use of visual arts in the service of personal development: history, theories, range of practice. Illustrated lectures, reading, discussion, studio work. For students not intending to specialize in Art Therapy. Open to advanced undergraduates with permission of instructor. (Fall and spring)

218 **Seminar: Systems of Psychotherapy** (3) Silber

Introduction to theory and technique of psychotherapeutic approaches: psychoanalytic, ego-centered, nondirective, transactional, and others. Original source surveyed. Open to advanced students with permission of instructor. (Spring)

275 **Group Art Therapy** (3) Kwiatkowska, Ulman

Development of skills and increased awareness as a participant in an art therapy group. Restricted to selected master's candidates with permission of the instructor. Prerequisite: a minimum of 6 semester hours of graduate course work in Art Therapy. (Fall and spring)

283–84 **Practicum in Art Therapy** (3–3) Staff

Field experience. On-the-job supervision supplemented by supervision from

the art therapy staff. Prerequisite: ArTh 201 and 203. Consult with adviser before registration.

285 **Special Projects in Art Therapy** (3) Staff

Individual work based on study, research, or practice. Details to be worked out with each student. Resource people may be called upon to assist, as appropriate. May be repeated for credit with approval of adviser.

290–91 **Special Projects in Art Therapy** (3) Staff

Art therapists and other mental health professionals will conduct four 7-hour weekend workshops during each semester. Emphasis on the elucidation of concepts of treatment through lecture, discussion, and participation. Students registered in the Art Therapy Program will aid in selection of subjects and leaders. (Fall and spring)

Astronomy

See "Physics."

Biochemistry

Professors C.R. Treadwell (*Chairman*), B.W. Smith, G.V. Vahouny, J.M Bailey, Helen Hess
Professorial Lecturers W.W. Burr, Jr. (*Isotopes*), Edward Steers, Jr., Gordon Guroff, A.N. Schechter, Elizabeth Anderson
Assistant Professorial Lecturer C.L. Trichilo
Associate Professors G.A. Walker, L.D. Faller (*Visiting*)
Assistant Professor Linda Gallo
Lecturer P.H. Fishman
Special Lecturer J.C. Smith, Jr.

Master of Science in the field of Biochemistry.—Prerequisite: a Bachelor's degree. The undergraduate program must have included the following courses, or equivalent: BiSc 11–12; Chem 11–12, 22, 151–52, 153–54; Phys 1, 2.

Required: the general requirements, pages 93–100, including Bioc 221–22, 22[illegible], 262, 299–300. The remaining courses are to be selected from Bioc 224, 232, 241, 26[illegible], 295; or, with the approval of the adviser, from graduate courses in Chemistry, Microbiology, Physiology, or Pharmacology. It is usually not possible to arrange courses and research so that the student can be assured of completing all of the required work in one academic year.

Doctor of Philosophy in the field of Biochemistry.—Required: the general requirements, pages 93–97, 100–102.

Research fields: Amino Acid Metabolism; Animal Nutrition; Biochemical Evolution; Biochemistry of Cancer; Biochemistry of Tissue Culture; Carbohydrate Metabolism; Chemistry and Metabolism of Carbohydrates, Lipids, Proteins; Complex Lipids; Endocrinology; Intermediary Metabolism; Lipids; Metabolic Relationships of Insulin; Metabolism; Metabolism of Connective Tissue; Metabolism of Purines and Pyrimidines; Neurochemistry; Nutrition; Protein Biosynthesis; Protein Metabolism; Tissue Respiration; and Vitamins.

221–22 **General Biochemistry** (3 or 4–4 or 5) Vahouny, Gallo, and Staff

A comprehensive course in general biochemistry for graduate students in biomedical sciences and undergraduate students in biology and chemistry. Graduate students *must* register for Bioc 221, 4 semester hours; Bioc 222, 5 semester hours. With specific recommendations by the undergraduate adviser and the Department, undergraduate students may register for Bioc 221, 3 semester hours; Bioc 222, 4 semester hours. Prerequisite: Chem 152, 154. Material fee (graduate students only), $20 a semester. (Academic year)

224 **Biochemistry of Enzymes** (1) E. Anderson

Biochemistry of enzymes and enzyme reactions. Prerequisite: Bioc 221. (Fall)

225 **Biochemistry Procedures** (3) B. Smith and Staff

Laboratory course. Material fee, $16. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

227 **Biochemistry Seminar** (1) Bailey

Current literature in biochemistry. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

232 **Proteins and Amino Acids I** (1) Steers

Prerequisite: Bioc 221. (Fall)

233 **Proteins and Amino Acids II** (1) Steers, Schechter

Continuation of Bioc 232. Methods for the study of protein confirmation; determination of active sites of enzymes; mechanisms of reactions at the active site. (Spring)

241 **Isotopes** (3) Burr

Theoretical characterization of isotopes and their application in biology and medicine. Attention given to counting, health physics and radiation safety, autoradiography, chromatography. Laboratory fee, $16. (Spring)

251 **Carbohydrate Metabolism** (1) Staff

Prerequisite: Bioc 222. (Spring 1976 and alternate springs)

252 **Biochemistry of the Brain** (1) Malone*

For medical students; open to limited number of graduate students. Re-

*Dr. Malone is Professor of Neurology and of Child Health and Development in the School of Medicine and Health Sciences.

cent biochemical developments in structure, functions, and metabolic processes unique to the brain. (Spring)

254 **Human Nutrition** (1)

For medical students; open to limited number of graduate students. Application of nutritional principles in humans. (Spring)

256 **Biochemistry of Organ Function** (1) N. Kramer*

For medical students; open to limited number of graduate students. Emphasis on biochemical processes unique to particular organ systems; application of these processes to evaluation of function. (Spring)

260 **Biochemistry of the Steroids** (1) O. Dodek†

For medical students; open to limited number of graduate students. Basic chemistry of the steroids, pathways of biosynthesis and metabolism, regulatory mechanisms, physiologic effects, clinical measurements of endogenous steroids, clinical manifestations of steroid imbalance, steroid changes in pregnancy, and steroid therapy. (Spring)

262 **Biochemistry of the Lipids** (1) Vahouny

Discussion of topics of current interest, including digestion, energy production, biosynthesis, function in specialized tissues, and subcellular particles. Content differs each time course is offered; may be repeated for credit. (Spring)

266 **Biochemical Genetics and Inherited Metabolic Diseases** (1) W. F. Anderson

(Formerly Biochemical Genetics)

For medical students; open to limited number of graduate students. Biochemical aspects of genetics and contributions of molecular biology to understanding of human mutations and hereditary diseases. (Spring)

268 **Biochemistry of Bone and Muscle** (1) Walker

Study of structure, chemistry, and biochemistry as they relate to the normal and diseased states of bone and muscle; emphasis on current theories and techniques. (Spring)

295 **Research in Biochemistry** (arr.) Staff

Participation in a project under investigation in the Department or one in a related field suggested by the student and approved by the Staff. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

---

* Dr. Kramer is Associate Professor of Medicine in the School of Medicine and Health Sciences.
† Dr. Dodek is Assistant Clinical Professor of Obstetrics and Gynecology in the School of Medicine and Health Sciences.

399 Dissertation Research (arr.) **Staff**

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Biological Sciences

Professors A.H. Desmond (*Chairman*), R.L. Weintraub, Kittie Parker
Adjunct Professors T.E. Bowman, M.L. Jones, L.S. Kornicker, H.A. Rehder, F.A. Chace, Jr., Raymond Manning
Professorial Lecturers K.C. Kates, R.S. Sigafoos, W.A. Shropshire, Jr., C.G. McWright
Associate Professors S.O. Schiff, D.L. Atkins, R.E. Knowlton, Henry Merchant, R.K. Packer
Adjunct Associate Professors W.D. Hope, D.L. Pawson, Joseph Rosewater, C.F. Roper, Mary Rice
Associate Professorial Lecturers P.E. Spiegler, Jessie Dickens, Barbara Timberlake
Assistant Professors W.G. Nash, T.L. Hufford, C.S. Henry, Sandra Smith-Gill
Assistant Professorial Lecturer Dee Ann Houston
Lecturer Thomas May

Bachelor of Arts or Bachelor of Science with a major in Biology, Botany, or *Zoology* (*Departmental*).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Social Studies and the Humanities.)
2. Prerequisite courses—BiSc 11–12, or equivalent.
3. Required courses in related areas—Chem 11–12; Chem 151–52 and 153–54, or 50. (The following courses are strongly recommended: Math 31; Phys 1, 2; two years of French, German, or Russian; Stat 91.)
4. (a) Required courses for the major in Biology—a minimum of 24 semester hours of second-group courses, which should include at least 6 hours in Biology, 6 in Botany, and 6 in Zoology.

(b) Required courses for the major in Botany—a minimum of 24 semester hours of second-group courses in Botany or a combination of Botany and Biology.

(c) Required courses for the major in Zoology—a minimum of 24 semester hours of second-group courses in Zoology or Biology.

Master of Science in the field of Biology, Botany, or *Zoology*.—Prerequisite: a Bachelor's degree with a major in one of the following from this University, or an equivalent degree: (1) *Biology field*—an undergraduate major in Biology, Botany, or Zoology; (2) *Botany field*—an undergraduate major in Botany or Biology; (3) *Zoology field*—an undergraduate major in Zoology or Biology. The undergraduate program must have included the following courses, or equivalent: Chem 151–52 and 153–54, or 50; Math 31; Phys 1, 2.

Required: the general requirements, pages 93–100. The minimum requirement consists of 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours). With the permission of the Department a student may elect a program of study consisting of 36 semester hours of approved course work without a thesis.

Doctor of Philosophy in the field of Biology, Botany, or *Zoology.*—Required: the general requirements, pages 93–97, 100–102. The program of study is determined in consultation with the graduate committee of the Department. Each candidate is required to pass the General Examination in four areas which support the field of study selected. The required courses and tool subject options vary with the field of study undertaken.

Research fields in Biology: Cell Physiology, Cytogenetics, Cytology, Developmental Genetics, and Molecular Genetics.

Research fields in Botany: Photobiology, Phycology; Plant Ecology, Plant Physiology (Microorganisms), Plant Physiology (Vascular Plants), and Taxonomy.

Research fields in Zoology: Animal Ecology; Bioenergetics; Comparative Neuroanatomy; Comparative Physiology; Herpetology; Histophysiology; Invertebrate Zoology; Marine Biology; Radiation Biology; Taxonomy, Anatomy, and Physiology of Mollusks; Vertebrate Anatomy and Taxonomy; Vertebrate Embryology and Morphogenesis; Vertebrate Ichthyology; and Vertebrate Physiology.

Bachelor of Arts in Education with a teaching field in Biology.—Prerequisite: the Education curriculum, page 79.

Required: the Biology option and the professional courses listed on pages 112, 120–21.

Departmental prerequisite: BiSc 11–12 or equivalent is prerequisite to all second-group courses in Biology, Botany, and Zoology, except by permission of the instructor.

BIOLOGY

FIRST GROUP

3–4 **Introductory Biology for Nonscience Majors** (3–3) Schiff

Lecture (2 hours), laboratory (2 hours). Survey of biological principles; emphasis on man as a functional organism in his environment. Prerequisite to BiSc 4: BiSc 3. Material fee, $15 a semester. (Academic year)

11–12 **Introductory Biology for Science Majors** (4–4) Merchant

Lecture (3 hours), laboratory (3 hours). Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Prerequisite to BiSc 12: BiSc 11. Material fee, $18 a semester. (Academic year)

*26 **Environmental Issues** (3) Langran, Schiff

An interdisciplinary analysis of selected aspects of the population question, pollution and human health, urban environmental problems, issues of economic growth and development, technology and public policy. (Fall and spring)

SECOND GROUP

103 **Marine Biology** (4) Knowlton

Lecture (2 hours), laboratory and field (3 hours), plus some extended field trips. Study of relationships between organisms and physical, chemical, and biological factors of the marine environment. Consideration of the

---

* Offered jointly by the Division of Experimental Programs and the departments of Biological Sciences and Geography and Regional Science.

open ocean and coastal eco-systems and man's influence on them. Recommended: BiSc 101 or 102, 106, 140. Material fee, $20. (Spring)

108 **Organic Evolution** (3) Henry

Synthetic theory of organic evolution including treatment of speciation, adaptive radiation, biogeography, population biology, sociality, and human evolution. (Spring)

111 **Introductory Microbiology** (4) Weintraub

Lecture (2 hours), laboratory (4 hours). Survey of the major groups of microorganisms with emphasis on structure, physiology, ecology, phylogenetic relationships, and economic importance. Prerequisite: one year of chemistry. Material fee, $20. (Fall and spring)

115 **Cytology** (4) Schiff

Lecture (2 hours), laboratory (4 hours). Structure and function of cells; analysis of chromosomes; cytological techniques and preparation of slides. Recommended: one year of chemistry. Material fee, $18.

118 **Advanced Cytology** (3) Schiff

Lecture (1 hour), laboratory (4 hours). Mechanisms of cell action. Laboratory consists of a project to be selected by the student with concurrence of the instructor. Prerequisite: BiSc 115. Material fee, $20.

122 **Cell Biology I: Molecular and Subcellular Biology** (3) Weintraub

Structure and function of biological molecules, viruses, and cellular organelles. Prerequisite: one semester of organic chemistry. (Fall)

123 **Cell Biology II: Cell Biochemistry** (3) Weintraub

Introduction to the metabolism of generalized cells of animals, plants, and microorganisms, including energetics, enzymes, respiration, biosyntheses, and regulatory mechanisms. Prerequisite: one semester of organic chemistry. (Spring 1976 and alternate springs)

124 **Cell Biology II: Cell Biochemistry Laboratory** (1) Weintraub

Designed to illustrate some of the principles and techniques of biochemical experimentation. Prerequisite or concurrent registration: BiSc 123. Material fee, $24. (Spring 1976 and anternate springs)

127 **Genetics** (3) Nash

(BiSc 127 and 128 replace former BiSc 127 [4])

Introductory course. Basic aspects of transmission of genetic traits with particular reference to the chemical basis of heredity and gene action. (Fall and spring)

128 **Genetics Laboratory** (1) Nash

(BiSc 127 and 128 replace former BiSc 127 [4])

Study of genetic principles using Drosophila, *E. coli*, and lambda phage. Prerequisite or concurrent registration: BiSc 127. Material fee, $20. (Fall and spring)

129 **Cell Biology III: Cell Physiology** (3) Weintraub

Study of cell processes, including growth, division, differentiation, interactions, aging, movements, energy perception and transduction, luminescence. (Spring 1977 and alternate springs)

130 **Cell Biology III: Cell Physiology Laboratory** (1) Weintraub

Exercises to illustrate some principles and techniques. Prerequisite or concurrent registration: BiSc 129. Material fee, $24. (Spring 19[illegible] and alternate springs)

138 **Advanced Genetics** (3) Nash

Emphasis on the use of genetic analysis in solving modern biological problems. Prerequisite: introductory course in genetics. (Spring)

167 **Radiation Biology** (3) Schiff

Chemical, physical, and biological aspects of radiation; effects of radiation on cells and organisms, with emphasis on mammals; genetic effects. Recommended: two years of biological sciences, and chemistry or physics. (Fall)

171 **Undergraduate Research** (arr.) Staff

Admission by permission of the staff member concerned. May be repeated for credit. Prerequisite: Chem 50 or 152; 16 semester hours in Biological Science courses. Material fee, $20. (Fall and spring)

172 **Independent Study in Cell and Molecular Biology** (2) Staff

Prescribed reading list and consultations with staff adviser culminating in a written report and/or examination. (Fall and spring)

173 **Independent Study in Developmental Biology** (2) Staff

Prescribed reading list and consultations with staff adviser culminating in a written report and/or examination. (Fall and spring)

174 **Independent Study in Organismic Biology** (2) Staff

Prescribed reading list and consultations with staff adviser culminating in a written report and/or examination. (Fall and spring)

175 **Independent Study in Genetic and Evolutionary Biology** (2) Staff

Prescribed reading list and consultations with staff adviser culminating in a written report and/or examination. (Fall and spring)

176 **Independent Study in Environmental Biology** (2) Staff

Prescribed reading list and consultations with staff adviser culminating in a written report and/or examination. (Fall and spring)

177 **Laboratory Techniques, Instrumentation, and Data Analysis** (3) Staff

Theory and practice in experimental design; techniques and instrumentation used in biological research laboratories.

181–82 **Senior Seminar** (1–1) (Academic year)

Lectures and discussions on current biological problems.

185 **Human Nutrition** (3) Weintraub

Dietary requirements and their underlying physiological and biochemical bases; composition of natural and modified foodstuffs and additives; social and economic aspects of nutrition. (Fall)

THIRD GROUP

206 **Seminar: Radiation Biology** (3) Schiff

Actions of radiation at subcellular, cellular, and organismal levels; factors modifying radiation damage; practical considerations in radiation exposure. Prerequisite: BiSc 167 or equivalent. (Spring)

207 **Seminar: Origin of Life** (3) Weintraub

Review of experiments and speculations concerning origin of life and molecular aspects of biological evolution. (Spring 1977 and alternate springs)

208 **Seminar in Bioenergetics** (3) Merchant

Study of energy fixation and transfer in ecosystems. (Spring 1976 and alternate springs)

209 **Seminar: Principles and Mechanisms of Organic Evolution** (3) Henry

Principles and mechanisms of evolution in animals and plants; population phenomena, speciation, and evolution above the species level. (Fall 1976 and alternate falls)

220 **Seminar: Cell Physiology** (3) Shropshire

Review in depth of selected topics. May be repeated for credit. (Fall)

222 **Seminar: Topics in Molecular Biology** (3) Weintraub

(Spring 1976 and alternate springs)

227 **Seminar: Genetics** (3) Nash

Current problems in genetics. Students are required to present one seminar covering the full class period. May be repeated for credit. (Fall)

230 **Understanding Environmental Issues—Water Pollution** (6) Hufford and Staff

Methods and techniques used in determining water quality; engineering and technological skills currently utilized or available for use in dealing with a variety of water quality aspects; attitudes and approaches of the social scientists; practical aspects of implementing water-quality programs. Preparation of secondary school curricula.

248 **Analysis of Development** (3) Smith-Gill

Lectures and reports on experimental morphology, developmental genetics, biochemical development, and developmental endocrinology. (Spring 1976 and alternate springs)

249 **Seminar: Developmental Biology** (3) Smith-Gill
Discussion and reports on current literature in the field of developmental biology. (Spring 1977 and alternate springs)

255 **Seminar: Consortium Biology** (2)
Topic to be announced in *Schedule of Classes.* (Spring)

295 **Research** (arr.) Staff
Investigation of special problems. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

BOTANY

SECOND GROUP

105 **Local Flora** (4) Parker
Lecture (2 hours), laboratory and field (4 hours). Field and laboratory studies on local flora; emphasis on the woody plants. Material fee, $18. (Fall)

106 **Field Botany—Lower Plants** (4) Hufford
Lecture (2 hours), laboratory and field (4 hours). Primarily for non-specialists, emphasizing algae, mosses, and ferns. Material fee, $18. (Spring)

109 **Developmental Plant Anatomy** (4) Hufford
Demonstration, observation, discussion (6 hours). Initiation and ontogeny of tissues and organs of vascular plants. Material fee, $18. (Spring 1977 and alternate springs)

110 **Comparative Plant Morphology** (4) Hufford
Demonstration, observation, discussion (6 hours). Evolutionary morphology and life histories as a basis for a phylogenetic study and the critical roles plants have in human welfare. Material fee, $18. (Fall 1976 and alternate falls)

125 **Flowering Plants** (4) Parker
Lecture (2 hours), laboratory and field (4 hours). Origin, evolutionary

development, and principles of systematics of flowering plants. Material fee, $18. (Spring)

132 **Mycology** (4) Staff

Lecture (2 hours), laboratory (3 hours). Material fee, $18. (Spring)

133 **Plants, Man, and Life** (3) Hufford

Plants by which man lives and upon which he depends for his food, shelter, medicine, clothing, and industries, as well as his drugs and drinks. (Spring)

134 **Plant Pathology** (4) Staff

Lecture (2 hours), laboratory (3 hours). Material fee, $18.

135 **Plant Physiology** (4) Weintraub

Lecture (2 hours), laboratory (4 hours). Physiology of seed plants with emphasis on growth, development, tropisms, and reproduction. Prerequisite: Chem 11–12. Recommended: Chem 50 or 151–52. Material fee, $24. (Fall 1975 and alternate falls)

137 **Horticulture** (4) Parker

Lecture (2 hours), laboratory (4 hours). Basic principles of growth, propagation, and care of ornamental plants. Material fee, $18. (Fall)

141 **Plant Ecology** (4) Sigafoos

Lecture (2 hours), laboratory (4 hours). Material fee, $18. (Fall 1976 and alternate falls)

149 **Freshwater Algae** (4) Hufford

Observation and discussion (6 hours). Systematics, morphology, and physiology of freshwater groups of algae. Ecological interrelationships of growth habit, and importance to man. Field experience, including at least one weekend field trip. Material fee, $18. (Fall 1975 and alternate falls)

150 **Freshwater Diatoms** (4) Hufford

Observation and discussion (6 hours). Taxonomy, morphology, and ecology of freshwater diatoms. Critical light microscopy, SEM microscopy, and role of diatoms in water quality studies, and their importance to man. Field experience. Material fee, $18. (Spring 1976 and alternate springs)

THIRD GROUP

221 **Seminar: Systematics** (3) Parker

Review of current work in various disciplines of systematic research; topics of special interest to participants. May be repeated for credit. (Fall 1975 and alternate falls)

235 **Seminar: Plant Physiology** (3) Staff

237 **Seminar: Water Pollution Biology** (3) Hufford
Review of current research in water quality and water pollution biology
(Fall 1976 and alternate falls)

238 **Seminar: Current Topics in Phycology** (3) Hufford
(Spring 1977 and alternate springs)

242 **Seminar: Plant Ecology** (3) Sigafoos
(Fall 1975 and alternate falls)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

ZOOLOGY

SECOND GROUP

101 **Invertebrate Zoology** (4) Knowlton
Lecture (2 hours), laboratory (4 hours). General survey of invertebrate animals, including classification, morphology, physiology, embryology, and evolutionary relationships among phyla. Material fee, $20. (Fall)

102 **Advanced Invertebrate Zoology** (4) Knowlton
Lecture (2 hours), laboratory and field (4 hours). Study of invertebrate systems (cells, tissues, organs, organisms), with emphasis on functional aspects (physiology and ecology) and taxonomy of important groups. Prerequisite: BiSc 101 or equivalent. Material fee, $20. (Spring)

104 **Comparative Vertebrate Anatomy** (4) Atkins
Lecture (2 hours), laboratory (4 hours). Evolution and comparative morphology of vertebrates, stressing recent forms. Material fee, $20.
(Fall and spring)

140 **General Ecology** (4) Merchant
Lecture (3 hours), laboratory and field (3 hours). Introduction to the concepts of limiting factors, biogeochemical cycles, trophic levels, and energy transfer, and their relationship to the structure and function of population, species, communities, and ecosystems. Material fee, $20.
(Fall)

143 **Animal Ecology** (4) Merchant
Lecture (3 hours), laboratory and field (3 hours). Application of ecological principles to the understanding and manipulation of animal populations. Prerequisite: BiSc 140 or permission of instructor. Laboratory fee, $20. (Spring 1976 and alternate springs)

144 **Aquatic Ecology** (4) Merchant
Lecture (3 hours), laboratory and field (3 hours). Principles applied to aquatic systems with special references to physicochemical properties, typical habitats and communities. Prerequisite: BiSc 143 or permission of instructor. Laboratory fee, $20. (Spring 1977 and alternate springs)

145 **Introduction to Vertebrate Embryology** (4) Smith-Gill

Lecture (2 hours), laboratory (4 hours). Origin and early development of the individual, formation of organ systems. Emphasis on frog, chick, and pig, with reference to human embryo. Material fee, $20. (Fall)

146 **Experimental Developmental Biology** (4) Smith-Gill

Lecture (2 hours), laboratory (4 hours). Introduction to the experimental, biochemical, and genetic analysis of developing systems through examination of the literature and laboratory experiments. Prerequisite: BiSc 145 or equivalent, or permission of instructor. Recommended: a course in cell biology or genetics and Chem 50 or 151–52. Laboratory fee, $24. (Spring)

148 **Histology** (4) Desmond

Lecture (2 hours), laboratory (4 hours). Introduction to microscopical anatomy of normal tissues and organs with emphasis on the interrelationship of structure and function. Material fee, $20. (Fall and spring)

152 **Protozoa** (4) Staff

Lecture (2 hours), laboratory (4 hours). Introduction to protozoa; classification, life histories, genetics, and physiology; emphasis on free-living types. Material fee, $20. (Spring 1976 and alternate springs)

153 **Survey of Neurobiology** (4) Atkins

Lecture (2 hours), laboratory (3 hours). Study of the gross and cellular anatomy, physiology, and biochemistry of the nervous system; emphasis on mammals. Prerequisite: BiSc 104. Material fee, $24. (Spring 1977 and alternate springs)

154 **Vertebrate Zoology** (4) Atkins

Lecture and discussion (2 hours), laboratory and field (4 hours). Vertebrate natural history and systematics, emphasizing higher and transitional taxa. Prerequisite: BiSc 104. Material fee, $20. (Spring 1976 and alternate springs)

155 **Parasitology** (4) Kates

Lecture (2 hours), laboratory (4 hours). Introduction to animal parasitology; survey of parasitic types from protozoa through arthropods. Material fee, $20. (Fall 1976 and alternate falls)

157 **Comparative Endocrinology** (3) Desmond

Comparative study of basic principles of chemical integration, neuroendocrine relationships, and mechanisms of hormone action. Prerequisite: BiSc 104 and/or concurrent registration in Chem 151–52. (Spring)

161 **Entomology** (4) Henry

Lecture (2 hours), laboratory (4 hours). The biology of insects, including their morphology, physiology, development, behavior, and ecology. Material fee, $20. (Fall)

162 **Insect Evolution** (4) Henry

Lecture (2 hours), laboratory (4 hours). Adaptive radiation of insects; emphasis on insect-plant relationships, behavior, and paleontology. Prerequisite: BiSc 161. Material fee, $20. (Spring)

163 **Human Physiology** (3) Packer

Introduction to the function of organ systems of the human body. (Fall)

164 **Human Physiology Laboratory** (1) Packer

Study of basic physiology laboratory techniques; emphasis on the experimental study of homeostatic mechanisms in humans. Prerequisite or concurrent registration: BiSc 163. Material fee, $24. (Fall)

165 **Vertebrate Physiology** (4) Packer

Lecture (3 hours), laboratory (3 hours). Detailed study of selected organ systems, stressing chemical and physical bases. Prerequisite: BiSc 163 and 164, or equivalent. Prerequisite or concurrent registration: Chem 151–52 or 50. Material fee, $24. (Spring)

THIRD GROUP

204 **Seminar: Invertebrate Zoology** (3) Knowlton

Review of selective topics in physiology, development, and ecology of invertebrate animals, including reports on original publications. May be repeated for credit. (Fall)

*205 **Comparative Pathology** (3) Zook

An introduction to the study of disease and disease mechanisms in vertebrates, and comparison with disease in man. Recommended: courses in anatomy, histology, and physiology. (Fall)

210 **Animal Behavior** (3) Henry

Principles of animal behavior, including mechanisms and manifestations from simple reflex systems to social interaction. (Spring 1976 and alternate springs)

211 **The Social Insects** (3) Henry

Morphology, behavior, and classification of the social insects; emphasis on comparison of colonial organization of major groups. (Spring 197[illegible] and alternate springs)

244 **Histophysiology** (3) Desmond

Study of current publications in the field of histophysiology. (Fall)

245 **Histochemistry** (3) Desmond

Theory and application of chemical techniques in determining changes in the amount and distribution of inorganic and organic constituents of tissues during different physiological and pathological conditions. (Spring)

252 **Seminar: Neurobiology** (3) Atkins

Study of current publications in the field of neurobiology. (Fall 197[illegible] and alternate falls)

* An interdepartmental course offered by the departments of Biological Sciences and Pathology.

265 **Comparative Animal Physiology** (3) Packer
Survey of the physiological basis of adaptation of animals to diverse environments, emphasis on nonmammalian vertebrates. Prerequisite: BiSc 164 or equivalent. (Fall)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

Biology

See "Biological Sciences."

Botany

See "Biological Sciences."

Business Administration

Professors J.L. Jessup, R.B. Eastin, Edwin Timbers, H.R. Page, D.D. Roman, Frederick Amling, Guy Black (*Chairman*), P.D. Grub, R.C. Sedwick, P.M. Horvitz (*Visiting*), G.P. Lauter
Professorial Lecturers L.C. Collins, K.F. McClure, J.P. Murphy, J.F. Doubleday, W.G. Torpey, Ben Burdetsky, P.M. Dickey
Associate Professors E.R. Magruder, Rodney Eldridge, R.A. Barrett, S.F. Divita, S.N. Sherman, Norma Loeser, J.H.H. Carrington, C.R. Miller, J.J. Hampton
Associate Professorial Lecturers W.G. Wells, Jr., Bruce Benefield, Martin Wender, J. R. Potter, Jr.
Assistant Professors J.W. Waldrip, R.F. Dyer
Assistant Professorial Lecturers N.R. Harbaugh, L.R. Brown, Stanley Tesko

Programs of study in Business Administration leading to the degrees of *Bachelor of Business Administration*, *Master of Business Administration*, and *Doctor of Business Administration* are offered by the School of Government and Business Administration (see pages 133–63).

FIRST GROUP

51 **Introduction to Business** (3) Page
Structure, activities, and problems of business enterprise; its contribution to the individual and to society; careers in business. (Fall and spring)

61 **Personal Finance** (3)

Management of personal and family income and expenses; consumer spending, budgeting, home buying, credit buying, borrowing, banking, saving and investing, insurance and estate planning, taxation. (Not offered 1975–76)

SECOND GROUP

101 **The Business Environment** (3) Timbers

Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues. (Fall and spring)

102 **Fundamentals of Management** (3) Carrington

Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking. (Fall and spring)

104 **Small Business Management** (3) Carrington

Essentials of operating a small business; required records and reports, resolution of day-to-day problems, sources of assistance to small businesses. Offered primarily as a service to the business community; open to degree candidates with the approval of the instructor. (Spring)

105 **Personnel Management** (3) Loeser

The labor force and labor markets. Industrial personnel and manpower programs, organization and policy in personnel activities. (Fall and spring)

106 **Leadership in Personnel Management** (3) Loeser

(Formerly Problems in Personnel Management)

A study of the philosophy, principles, policies, and programs for effective personnel management and industrial relations as portrayed by case studies drawn from business and government. Prerequisite: BAd 105 or permission of instructor. (Fall)

107 **Collective Bargaining** (3) Staff

American unionism and collective bargaining; economic, social, and public policy considerations. The negotiation and administration of collective bargaining agreements. Prerequisite: BAd 105 or permission of instructor. (Spring)

113 **Real Estate** (3) Doubleday

Principles of urban real estate practice; leasing and property management, valuation, appraisal, financing, taxation, urban growth, urban renewal. (Not offered 1975–76)

121 **Fundamentals of Insurance and Risk Management** (3) Doubleday, Wells

Function of insurance and risk management in business enterprise. (Fall)

122 **Insurance and Estate Planning** (3) Doubleday, Wells

Insurance and estate programming in providing protection and estate development; disposition of the individual estate. (Spring)

131 **Business Finance** (3) Amling

Analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, sources of funds, capital budgeting, stockholder relationships. Prerequisite: Acct 1–2; Econ 1; Math 30, 31; Stat 51. (Fall and spring)

132 **International Business Finance** (3) Eldridge

Principles, practices, problems, and institutions of international finance. Emphasis on international financial markets, exchange rates, balance-of-payments restraints, and governmental policies. Prerequisite: BAd 131. (Fall)

133 **Capital Formation** (3) Eldridge

The process of capital formation in a free enterprise economy. Roles of business firms, financial intermediaries, money and capital market institutions, governmental regulatory agencies, fiscal and monetary policies. Prerequisite: BAd 131. (Spring)

138 **Investment and Portfolio Management** (3) Amling

Theory and principles of security analysis and portfolio management, including analysis of the national economy, industry, company, and security markets. Risk-reward and computer-aided analysis. Prerequisite: Acct 1–2, BAd 131. (Spring)

141 **Basic Marketing Management** (3) Divita, Waldrip

Marketing and marketing management, consumer and demand analysis, retailing, wholesaling. Emphasis on major decision areas and tools. Prerequisite: Econ 1–2, BAd 102. (Fall and spring)

143 **Marketing Research** (3) Lauter, Dyer

Principles and practices of marketing research; emphasis on basic methods and techniques, sources and interpretation of data, and presentation of results. Prerequisite: BAd 141. (Spring)

144 **International Marketing Management** (3) Waldrip, Lauter

Analysis of the international marketing position of the United States, channels for international marketing, international advertising media, legal aspects, foreign market surveys, development of policies. (Fall)

145 **Sales Management** (3) Waldrip

Organization of sales department, sales planning and forecasting, quotas, territories, performance standards, and analysis and control of distribution costs. Prerequisite: BAd 141. (Fall)

147 **Advertising** (3) Dyer

Advertising as a function of marketing and merchandising; uses and limitations, evaluation, criticism, and control of advertising. (Spring)

158 **Physical Distribution Management** (3) Potter

Distribution from shipper's point of view: problems of plant location, inventory control, warehousing; traffic management emphasized, including private carriage. Prerequisite: Econ 1–2. (Fall)

161 **Commercial Law** (3) Collins, McClure, Murphy

Fundamental concepts and principles of law encountered in business activity; contracts, bailments, agency, sales, negotiable instruments, bankruptcy, other topics. Basic legal considerations in business decision-making. (Fall and spring)

171 **Principles of Transportation** (3) Staff

Impact of intercity transportation systems on society. Emphasis on modal differences in development, economic characteristics, and regulation. Prerequisite: Econ 1–2. (Fall)

172 **Public Utilities** (3) Staff

Legal and economic meaning of public utility concept; development, services, economic characteristics, rate-making, and regulation with emphasis on electric, gas, and telephone industries. Prerequisite: Econ 1–2. (Spring)

173 **Transportation Systems Management** (3) Staff

Comparative study, from the standpoint of various carrier modes, of management problems common to all modes of domestic and international transportation. Prerequisite: BAd 171, Econ 1–2. (Spring)

174 **Urban Transportation** (3) Staff

Problems of developing balanced transportation systems for urban areas—area needs, modal evaluation, cost effectiveness, finance, and marketing. Prerequisite: BAd 171, Econ 1–2; or equivalent. (Fall)

175 **Introduction to International Business** (3) Kaye, Waldrip

Physical movement of goods in international business; conditions essential for successful trading; export shipment, documentation, procedural problems. Emphasis on ocean marine insurance and export traffic management policy. Prerequisite: Econ 1–2. (Fall and spring)

176 **International Business Theory and Policy** (3) Eldridge

Theoretical relationships underlying international business transactions, role of government, international agreements between private producers, trade with developing nations, policy. Prerequisite: Econ 1–2. (Spring)

178 **International Business Policy and Operations** (3) Waldrip

Analysis of overseas projects according to purpose and type of organization; development and management of overseas operations in different world areas. Prerequisite: BAd 175 or permission of instructor. (Spring)

181 **Manufacturing Production** (3) D. Roman

Basic principles and methods of manufacturing production. Manufacturing facilities, plant and equipment. Illustrations selected from various process and fabrication industries. Prerequisite: Math 51, 52; Stat 51 or equivalent. (Fall and spring)

192 **Internship in Business Administration** (3) Carrington

Internship assignment with an extramural sponsor: a business firm, a business-related government agency, or an interest group. Open to selected juniors and seniors by permission of adviser. (Fall and spring)

198 **Business Policy and Administration** (3) Eastin

Terminal undergraduate course in Business Administration. Integration of functional activities in arriving at over-all business policy decisions. Prerequisite: BAd 102, 105, 131, 141, 181. (Fall and spring)

199 **Individual Research** (3)

Assigned topics. Admission by prior permission of adviser. May be repeated once for credit. (Fall and spring)

THIRD GROUP

201 **Social Environment of Business** (3) Timbers

Contemporary social forces acting on business management; business responsibility, ethics. (Fall)

202 **Relations of Government to Business** (3) Timbers

Regulatory and promotional activities of the government, independent regulatory agencies, antitrust activities, monetary and fiscal policy, regulation of labor-management relations. (Spring)

203 **Legal Environment of Business** (3) Timbers

Business under the U.S. Constitution, federal legislation, legal precedents, and agency orders. Major emphasis on court decisions relating to business. Prerequisite: BAd 202 or permission of instructor. (Spring)

204 **Legal Aspects of International and Multinational Business** (3) Staff

Legal environment of international and multinational business including legal systems, antitrust laws, regulation of direct investment, international arbitration and expropriation; topics of current interest. (Spring)

208 **Personnel Management and Industrial Relations** (3) Loeser, Magruder

Survey of personnel management practices and procedures, including labor-management relations. (Fall)

209 **Seminar: Personnel Management** (3) Eastin

Industrial personnel and manpower management, research in advanced problems. (Spring)

210 **The Personnel Manager** (3) Jessup

The personnel manager and his place in the organization, relation to other executives, policy role and relations with chief executive. Problems of the senior personnel executive. Prerequisite: B Ad 208 or permission of instructor.

211 **Leadership and Executive Development** (3) Loeser

Theories of managerial leadership; issues and problems associated with leadership in large organizations and at higher management levels; exec-

utive selection and development. Prerequisite: Mgt 201 or permission of instructor. (Spring)

212 **Unionism and Collective Bargaining** (3) Burdetsky

The American labor movement. Collective bargaining and the conduct of labor relations under collective bargaining agreements. (Fall)

213 **Current Issues in Unionism, Collective Bargaining, and Labor Relations** (3) Burdetsky

Current problems and issues. Prerequisite: BAd 212. (Spring)

220 **Administration of Research and Development** (3) Roman, Adam*

(Formerly Mgt 230)

Examination of technological, political, and economic factors affecting the R&D environment; operational aspects; management problems in military, governmental, and industrial organizations; project selection, resource allocation, personnel, planning and control, measurement and evaluation. (Fall)

222 **International Research and Development** (3) Roman

(Formerly Mgt 232)

Technological, political, social, and economic factors affecting international R&D policy; problems in industrial, governmental, and international organizations; world technological forecasting; resource allocation; technology transfer. Prerequisite: BAd 220 or permission of instructor. (Fall)

229 **Seminar: Administration of Research and Development** (3) Roman

(Formerly Mgt 239)

Individual and/or group in-depth research projects dealing with various phases of research and development management. Topic will vary each time the course is offered according to the emerging technology, current operational problems, and student interest. Prerequisite: 6 to 9 semester hours of research and development management or permission of instructor. (Fall)

225 **Seminar: Manufacturing Production** (3) Roman

Production technology, including new processes, materials, products, equipment, and facilities. Implications of emerging technology in managing the production function. Prerequisite: BAd 181 or permission of instructor. (Not offered 1975–76)

231 **Financial Decision-making** (3) Amling, Hampton

Functions and objectives of financial management, asset management, problems of internal financial analysis, rate-of-return analysis, financial forecasting, problems of capital demand and supply. Prerequisite: Acct 115 or equivalent, BAd 131. (Fall and spring)

232 **Capital Resource Management** (3) Amling, Hampton

Problems of capital acquisition, costs, rationing, structure; dividend policy. Prerequisite: BAd 231. (Fall)

233 **International Business Finance** (3) Eldridge

Analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: BAd 131 or equivalent. (Fall and spring)

234 **Seminar: Capital Formation** (3) Eldridge

Determinants of saving and investment, timing of corporate security issues, analysis of current capital market conditions. Prerequisite: BAd 131 or equivalent. (Fall and spring)

235 **Financial Management** (3) Amling

Problems of financial management; planning financial structure, obtaining and managing capital, issuing and placing securities, administering income, security arrangements. Prerequisite: Acct 215, Mgt 201. (As arranged)

237 **Investment Analysis** (3) Amling

Risk-reward analysis of security investments including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory and computer methods. Prerequisite: BAd 131. (Fall and spring)

238 **Seminar: Investment and Portfolio Management** (3) Amling

Portfolio management theory, application, and computer modeling. Independent research on investment analysis and portfolio management with emphasis on theory, cases, and computer applications. Prerequisite: BAd 237.

241 **Marketing Management** (3) Dyer, Divita

Marketing management problems; market segmentation, product planning, channels of distribution, advertising, personal selling, sales promotion, pricing and development of integrated marketing programs. (Fall and spring)

243 **Seminar: Marketing Research** (3) Dyer

Research as an aid to decision-making and increased efficiency in marketing, marketing research process, critical appraisal of methods and results, applications. (Spring)

246 **Consumer Behavior** (3) Dyer

Consumer decision-making in the market place; research in pertinent interdisciplinary studies in psychology, sociology, and other behavioral fields; present and potential applications for marketing. (Fall)

247 **Current Issues in Marketing** (3) Dyer, Divita

Primarily for doctoral students. Theoretical and practical issues in the development of a comprehensive and interrelated body of knowledge in marketing. Impact of current political, economic, and social trends. (Fall)

248 **International Marketing** (3) Lauter

Organization for international marketing, demand analysis, product development and policies, marketing structure and trade channels, advertising and promotion problems and policies, pricing, and legal aspects. Effective international marketing strategy. (Fall and spring)

249 **Marketing Policy** (3) Divita

Analysis of complex marketing problems involving policy and operational decisions; emphasis on creative marketing strategy. (Spring)

250 **Marketing to the Government** (3) Divita

Overview of government R&D and systems markets. Government acquisition process, buyer behavior, market research, technological planning and the bid decision, field sales force management, proposals, market strategy, pricing strategy, product-line strategy. (Fall)

253 **Distribution Logistics** (3) Potter

Problems of physical distribution and supply of goods. Role of logistics in the economy and the business firm, transportation rates and services, location theory and problems, service standards, inventory control, information flow, scheduling, allocation, warehousing, traffic, and logistics system organization. (Spring)

255 **Multinational Corporations in the World Economy** (3) Grub, Eldridge

(Formerly International Business in Perspective)

Business in the world economy; multinational corporations as economic, political, and social institutions; ownership and growth strategies, relationships to other nations; national and international controls; future of the multinational corporation. (Fall and spring)

256 **Seminar: International Trade** (3) Grub, Eldridge

Classical and modern concepts of international trade theory, instruments and institutions of trade policy, barriers to trade, preferential treatment and trading blocs, trends and issues. (Fall and spring)

257 **Business Policy in the Multinational Firm** (3) Grub, Waldrip

(Formerly Operation of the Multinational Firm)

International market entry and expansion; operating policies, procedures, and problems of multinational companies; developing executives for international business. Prerequisite: advanced Master's degree standing. (Fall and spring)

260 **Economics for Management** (3) Staff

For students in the Navy Graduate Financial Management Program only. Economic theory and its application in managerial decision-making; price theory, income and employment theory, related topics. Review of economic methodology. (Summer)

261 **Applied Microeconomics** (3) Eldridge

Applications of economic theory and statistics to business decisions involving demand, production, cost, profits, investments, and inventories. Prerequisite: Econ 217, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor. (Fall and spring)

262 **Applied Macroeconomics** (3) Black

Use of economic theory and statistics in business forecasting; interpretation of economic trends and developments; analysis of governmental economic policies. Prerequisite: Econ 218, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor. (Fall and spring)

264 **Economics of Production** (3) Staff

Economics of production and manufacturing. Applications to managerial decision-making with respect to production, investment, procurement, research and development, and cost-benefit analysis. Prerequisite: Econ 217, Stat 111, college algebra or Mgt 203. (Not offered 1975–76)

265 **Seminar in Applied Economics** (3)

275 **Seminar: Transportation** (3) Staff

Problems and special areas of interest in transportation. Prerequisite: BAd 171 or permission of instructor. (Spring)

279 **Purchasing and Materials Management** (3) Page

Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, source selection, buying practices, policies, and ethics.

280 **Procurement and Contracting** (3) Staff

Overview of procurement and contracting; emphasis on federal government buying policies, practices, and procedures.

282 **Government Contract Administration** (3) Staff

Surveillance and management of contract performance. Measurement of progress; specification interpretation; quality assurance; changes, negotiation, and adjustment; financial considerations; property; terminations; regulatory and policy concerns. Prerequisite: BAd 280 or permission of instructor.

283 **Pricing and Negotiation** (3) Staff

Scope and objectives of negotiated procurement; preparation, conduct, and recording of negotiations; analysis of cost, price, profit, investment, and risk; cost principles; incentives; relationship of contract type to work requirements; techniques of negotiation. Prerequisite: BAd 280 or permission of instructor.

284 **Procurement Data Management** (3) Staff

Technical data and the procurement process; contract-controlling documentation, patent rights, rights in data, requirements determination and the acquisition of data, federal policies, contractor interests. Configuration management; control of changes. Prerequisite: BAd 280 or permission of instructor.

285 **Systems Procurement and Project Management** (3) D. Roman, Tesko

Development and procurement of major systems. Project management and its impact on the procurement process. Procurement planning. Prerequisite: BAd 280 or permission of instructor.

290 **Special Topics in Business Administration** (3) Staff

An experimental course enabling the department to develop new course topics and test new teaching methods. May be repeated once for credit. (Fall or spring)

291 **Seminar: Business Management** (3) Eastin
Primarily for doctoral students. Research on various phases of management as practiced in American industry. (Fall and spring)

295 **Research Methods** (3) (Same as Mgt 295) Dyer
(Formerly BAd 293 Business Research)
Theory and practice in research methodology. Data sources and gathering, research models and designs, analysis and testing, controls, interpretation and presentation of findings. (Fall and spring)

296 **Business Decision Simulation** (3) Staff
(Formerly BAd 295)
Managerial decision-making in a diversified firm in a simulated competitive environment in which a complex situation is played out using computers. Prerequisite: advanced Master's or doctoral degree standing.

297 **Business Policy Formulation** (3) Jessup, Page
Analysis of operational situations and policy issues. Developing and implementing solutions to managerial problems. Prerequisite: advanced Master's degree standing. (Fall and spring)

298 **Directed Readings and Research in Business Administration** Staff
(Formerly Readings in Business)
Supervised readings in selected fields within business administration. Admission by prior permission of instructor. May be repeated once for credit. (Fall and spring)

299 **Thesis Seminar** (3) Staff
Examination of thesis standards, research philosophy and methodology. (Fall and spring)

300 **Thesis Research** (3) Staff
(Fall and spring)

FOURTH GROUP

Fourth group Business Administration courses are limited to graduate students and are primarily for doctoral students. They are offered as the demand requires.

302 **Seminar: Government-Business Relations** (3) Timberg
Major current issues affecting government-business relations. Research and discussion on selected issues.

331 **Seminar: Finance and Investments** (3) Amling
Research seminar in corporate financial theory, investment portfolio theory and capital market theory. Prerequisite: BAd 232, 234, 238.

341 **Seminar: Marketing** (3) Divita, Dyer
Examination of current marketing literature and developments with emphasis on the advancement of the discipline.

358 **Colloquium on International Business** (3) Grub
(Formerly BAd 258)
Selected problems in international business with emphasis upon regionalism, trade barriers, investment incentives, international organization, foreign aid, and development assistance and its relation to trade with developing nations, and trade with the Communist Bloc. Admission by prior permission of instructor.

359 **Colloquium on Comparative Management** (3) Lauter
(Formerly BAd 259, Comparative Business Management)
Comparative analysis of management systems under different economic, social, and political conditions. Generic characteristics of management and how modified in different environments. Examination of selected literature. (Not offered academic year 1975–76)

365 **Seminar: Applied Economics** (3) Black
(Formerly BAd 265)
Primarily for doctoral students. Special topics and applications of analytical tools to business decision-making and policy. Prerequisite: BAd 261, 262; or permission of instructor.

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Business Administration general examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Business Administration candidates. May be repeated for credit.

Chemistry

Professors C.R. Naeser, R.C. Vincent, R.E. Wood, T.P. Perros, W.E. Schmidt, D.G. White, J.B. Levy, Nicolae Filipescu
Associate Professors A.D. Britt (*Chairman*), E.A. Caress, D.A. Rowley
Assistant Professor Michael King, Brian Moores (*Visiting*)

Bachelor of Arts or *Bachelor of Science with a major in Chemistry* (*Departmental*).—The Department offers two undergraduate majors designed to give students broad training in the basic divisions of chemistry; analytical, inorganic, organic, and physical. *Major I* provides considerable concentration in chemistry. However, it permits a wider selection of electives and thus should meet the needs of students preparing to enter medicine, dentistry, or related fields. *Major II* is intended primarily for students preparing for graduate study in chemistry or those planning to enter the chemical profession and wishing to be certified to the American Chemical Society as having met the minimum requirements for professional training. Two foreign languages are recommended for students planning to do graduate work in chemistry.

The following requirements must be fulfilled:

1. Students in either Major I or Major II must meet the general requirements as listed on pages 76–77, 83–89. (Students should consult the departmental adviser re-

garding courses to be taken in satisfying the requirements for "meaningful initiation" into the Humanities and Social Studies.)

2. Prerequisite courses for Major I and Major II—Chem 11–12 and 22, or 15–16; Math 30, 31; Phys 1, 2.

3. (a) Required courses for Major I—BiSc 11–12 or Geol 21–22 (required of Bachelor of Science degree candidates only); Chem 111–12, 113–14, 122, 134, 141, 151–52, 153–54.

(b) Required courses for Major II—BiSc 11–12 or Geol 21–22 (required of Bachelor of Science degree candidates only); Chem 111–12, 113–14, 122, 141–42, 151–52, 153–54, 235; Math 32; one course selected from Chem 195, 207, 213, 221, 222, 251, Math 111, 139, Phys 161, 165, 175, Stat 197.

Twelve semester hours in French, German, Greek, Hebrew, Italian, Latin, Russian, or Spanish (students in Major II should elect German) are recommended for students in both Major I and Major II.

For graduation with Special Honors in Chemistry, application must be made at the beginning of the senior year. Registration in Chem 195 is required at that time.

Master of Science in the field of Chemistry.—Prerequisite: a Bachelor's degree with a major in Chemistry from this University, or an equivalent degree.

Required: the general requirements pages 93–100. The required 30 semester hours of graduate work must include Chem 213 and 221, and at least two of the following: Chem 207, 236, and 251. The thesis requirement, Chem 299–300, may be in analytical, inorganic, organic, or physical chemistry. Chem 156, or its equivalent, is prerequisite to research work in the field of organic chemistry. A reading knowledge examination in French, German, or Russian (German or Russian preferred) must be passed prior to beginning the third semester of graduate work or before the second half of the work is started, whichever occurs first. A student who intends to become a doctoral candidate is strongly urged to take Chem 207 as early as possible in his graduate program.

Master of Science in the field of Geochemistry (an interdepartmental degree offered by the departments of Chemistry and Geology).—Prerequisite: a Bachelor's degree with a major in Chemistry or in Geology from this University, or an equivalent degree.

Required: the general requirements, pages 93–100, including Chem 111–12; Geol 141, 241, 249; Chem 213 or Geol 246; and Chem 299–300. The Master's Comprehensive Examination must be taken before registration for the second half of the thesis work. A reading knowledge examination in a foreign language, approved by the Department of Chemistry or Geology, must be passed prior to beginning the third semester of graduate work or before beginning the thesis work, whichever occurs first.

Doctor of Philosophy in the field of Chemistry.—Required: the general requirements, pages 93–97, 100–102. Chem 207, 213, 221, 235, 251, and 350 are normally required of the doctoral student, in addition to other courses as determined by consultation with the Departmental program committee. The tool requirement options are (1) a foreign language reading examination in German and either French or Russian or (2) a foreign language reading examination in German and a demonstrated proficiency in computer programming. The latter option is required for students in physical or theoretical chemistry. Cumulative examinations replace the "General Examination" requirement.

Research fields: Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, Physical Chemistry (Electrochemistry, Kinetics, Magnetic Resonance, Theoretical), Physical Organic Chemistry (Reaction Mechanisms), and Structure and Synthesis of Natural Products.

Doctor of Philosophy field of study in Geochemistry (an interdepartmental field offered by the departments of Chemistry and Geology.)—Required: the general requirements, pages 93–97, 100–102, including a reading knowledge examination in an approved foreign language plus the satisfactory completion of Stat 117 and 118, or

l; and the satisfactory completion of the General Examinations in four fields, in-luding chemistry and geochemistry.

Bachelor of Arts in Education with a teaching field in Chemistry.—Prerequisite: e Education curriculum, page 79.

Required: the Chemistry option and professional courses on pages 112–13, 120–21.

Graduate Placement Examinations: All entering students in the Master's and Doctoral programs in the field of Chemistry are required to take the American Chemical Society Graduate Level Placement Examinations, given by the Department of Chemistry, prior to registration in the Graduate School of Arts and Sciences. The four placement examinations (in the disciplines of analytical, organic, inorganic, and physical chemistry) are of the multiple-choice type. These tests are designed to cover the subject matter in the disciplines generally taught in modern undergraduate programs preparatory for graduate work in chemistry, and the results are used by the Department to advise the individual student in planning a program of courses appropriate to his background.

Registration: Before completing registration each student must obtain from the representative of the Department an assignment to lecture, recitation, and laboratory sections. The work of the junior and senior years must be approved by the Department.

All graduate students are required to participate in the seminar and colloquium programs.

PHYSICAL SCIENCE

FIRST GROUP

3–4 Contemporary Science (3–3) Filipescu

For nonscience majors. Lecture (2 hours), laboratory (3 hours). Contemporary topics from the physical sciences are integrated to introduce the nonscience major to the basic methods and achievements of physical science. Laboratory fee, $17 a semester. (Academic year)

CHEMISTRY

FIRST GROUP

11–12 General Chemistry (4–4) Staff

Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Elementary course in general chemistry, including qualitative analysis. Prerequisite to Chem 11: one year of high school algebra. Prerequisite to Chem 12: Chem 11. Laboratory fee, $23 a semester. (Chem 11 and 12—fall and spring)

13 General Chemistry (4) Britt

For engineering and applied science students only. Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Atomic structure, chemical bonding; chemical equations; acids and bases; chemical equilibrium; liquid and solid states; periodicity; electrochemistry; organic chemistry. Prerequisite: Math 31, Phys 2. Laboratory fee, $23. (Fall)

15–16 **Intensive General and Analytical Chemistry (Honors Course)** (4–4) Rowley

Chem 15: lecture (3 hours), laboratory (3 hours), recitation (1 hour). Chem 16: lecture (2 hours), laboratory (6 hours), recitation (1 hour). Equivalent to Chem 11–12 and 22, but with selected topics studied in depth. Prerequisite to Chem 15: high school physics and chemistry. Prerequisite to Chem 16: Chem 15. Admission by placement test prior to registration or on basis of College Board Advanced Placement Examination. Laboratory fee, $23 a semester. (Academic year)

22 **Introductory Quantitative Analysis** (4) Vincent

Lecture (2 hours), laboratory (6 hours). Theory and practice of quantitative analysis by classical methods; introduction to instrumental analysis. Prerequisite: Chem 12. Laboratory fee, $23. (Fall and spring)

50 **Introduction to Organic Chemistry** (4) Caress

Lecture (3 hours), laboratory (3 hours). A terminal course for students in related disciplines. This course does not fulfill the organic chemistry requirement for chemistry majors or premedical students. Prerequisite: Chem 12 or 16. Laboratory fee, $23. (Spring)

SECOND GROUP

110 **Introduction to Physical Chemistry** (3) Wood

Topics include chemical thermodynamics, chemical kinetics, electrochemistry, solution chemistry, membrane and phase equilibria, and others. Prerequisite: Chem 16 or 22, Math 31, Phys 2; or permission of instructor. Not open to chemistry majors. May not be taken for credit by students who have received credit for Chem 111–12 or an equivalent course.

111–12 **Physical Chemistry** (3–3) Wood

Gas laws, chemical thermodynamics, solution chemistry, chemical equilibrium, kinetics, chemical statistics, electrochemistry, and other topics. Prerequisite to Chem 111: Chem 16 or 22; Math 31; Phys 2. Prerequisite to Chem 112: Chem 111. (Academic year)

113–14 **Physicochemical Measurements** (2–2) Wood, Schmidt

Laboratory complement to Chem 111–12 and 122. Prerequisite or concurrent registration for Chem 113: Chem 111. Prerequisite or concurrent registration for Chem 114: Chem 112, 113, and 122. Laboratory fee, $23 a semester. (Academic year)

122 **Instrumental Analysis Lectures** (2) Schmidt

Theory of instrumental methods in qualitative and quantitative analysis, determination of structure, and study of reaction mechanisms with emphasis on electroanalysis, spectrophotometry, and chromatography. Correlated with Chem 114. Prerequisite or concurrent registration: Chem 112. (Spring)

134 **Descriptive Inorganic Chemistry** (2) Rowley

Intermediate-level course emphasizing the descriptive chemistry of the elements. Prerequisite: Chem 16 or 22, 152. Prerequisite or concurrent registration: Chem 111. (Fall)

141–42 **Advanced Experimental Chemistry** (2–2) White, Caress

Designed to provide the chemistry major with facility in experimental methods common to all disciplines of chemistry. Prerequisite: Chem 154. Prerequisite or concurrent registration: Chem 111. Laboratory fee, $23 a semester. (Academic year)

151–52 **Organic Chemistry** (3–3) Staff

Chemistry of the compounds of carbon. Prerequisite to Chem 151: Chem 12 or 16. Prerequisite to Chem 152: Chem 151. (Academic year)

153–54 **Organic Chemistry Laboratory** (1–1) Staff

Laboratory complement of Chem 151–52. Prerequisite or concurrent registration: Chem 151–52. Prerequisite to Chem 154: Chem 153. Laboratory fee, $23 a semester. (Academic year)

156 **Qualitative Organic Analysis** (3) Caress

Lecture (1 hour), laboratory (6 hours). Identification of pure organic compounds, separation of mixtures, and identification of their components. Required of all students planning research work in organic chemistry. Prerequisite: Chem 16 or 22, 154. Laboratory fee, $23. (Spring 1976 and alternate springs)

191 **History of Chemistry** (2) Perros

Historical development of chemistry from antiquity to the 20th century. Prerequisite: Chem 12 or 16. (Fall 1975 and alternate falls)

195 **Undergraduate Research** (1 or 2) Staff

Research on problems approved by the staff. May be repeated once for credit. Laboratory fee, $12 a semester hour. (Fall and spring)

THIRD GROUP

207 **Chemical Bonding** (3) Staff

Introduction to quantum chemistry. Molecular orbital theory, atomic and molecular structure spectroscopy. Prerequisite: Chem 112. (Fall)

211–12 **Physical Chemistry** (2–1) Wood

Same as Chem 111–12. Admission only by departmental permission. Credit assigned upon satisfactory completion of Chem 213. (Academic year)

213 **Chemical Thermodynamics** (3) Wood

Application of thermodynamics to chemical problems. Thermochemistry, homogeneous and heterogeneous equilibria, statistical calculation of thermodynamic properties, electrochemistry. Prerequisite: Chem 112 or 212. (Spring)

216 **Statistical Mechanics as Applied to Chemistry** (3) Staff

Introduction to classical and quantum statistics designed to acquaint the student with basic principles and application of method. Prerequisite or concurrent registration: Chem 207 or permission of instructor. (Spring 1976 and alternate springs)

217 Theory of Magnetic Resonance (3) Staff

Application of quantum theory and the techniques of magnetic resonance to chemical problems; emphasis on the connection between theory and experiment. Molecular motion, relaxation theory, bonding, etc. Prerequisite: Chem 207 or permission of instructor. (Spring 1977 and alternate springs)

219 Spectrochemistry (3) Filipescu

Energetic states of molecules under the influence of electromagnetic radiation and their relation to structures and spectroscopic properties. Prerequisite: Chem 207 and 221, or permission of instructor. (Spring 1977 and alternate springs)

221 Advanced Analytical Chemistry I (3) Britt

Theory and application of recent spectrometric methods of analysis, including electrical, magnetic, and optical instrumentation. Prerequisite: Chem 122. (Fall)

222 Advanced Analytical Chemistry II (2 or 3) Schmidt

Lecture (2 hours), laboratory (3 hours—optional). Theory and application of electroanalysis and separations by physiochemical methods. Prerequisite: Chem 122. Laboratory fee, $12. (Spring 1976 and alternate springs)

233 Organometallic Chemistry (3) White

Survey of organometallic compounds with emphasis on the compounds of lithium, boron, aluminum, silicon, the transition metals, and the catalytic role of certain organotransition metal complexes. Prerequisite: Chem 235 and 251, or permission of instructor. (Spring 1976 and alternate springs)

235–36 Advanced Inorganic Chemistry (3–3) White

Application of modern chemical theories to inorganic substances and reactions followed by a detailed study, developed from the periodic table, of the chemistry of the more common elements. Prerequisite to Chem 235: Chem 112, 152. Prerequisite to Chem 236: Chem 235. (Academic year)

237 Physical-Inorganic Chemistry (3) Rowley

Quantitative application of modern theories for interpretation and explanation of the electronic properties of transition-metal complexes. Prerequisite: Chem 112 and 134, or Chem 235. (Fall 1975 and alternate falls)

238 Topics in Transition Metal and Inner-transition Metal Chemistry (3) Perros

A systematic study of the significant and distinctive properties of the transition and inner-transition elements in relation to their positions in the periodic table. Prerequisite: Chem 236. (Fall 1976 and alternate falls)

251–52 Advanced Organic Chemistry (3–3) Filipescu

Synthesis, reactions, and properties of organic compounds; fundamental

theories of organic chemistry, emphasis on reaction mechanisms. Prerequisite to Chem 251: Chem 112, 152. Prerequisite to Chem 252: Chem 251. (Academic year)

257 **Physical-Organic Chemistry** (3) Levy

The transition state theory of chemical kinetics, applications to reaction mechanisms; kinetic isotope effects, linear-free energy relationships, concentrated and "super" acids, Woodward-Hoffman rules, free radical reactions. Prerequisite: Chem 252 or permission of instructor. (Fall 1975 and alternate falls)

258 **Synthesis and Structure Determination in Organic Chemistry** (3) Caress

Methods of structure determination and synthesis of complex organic molecules. Prerequisite: Chem 251 or permission of instructor. (Fall 1976 and alternate falls)

295 **Research** (arr.) Staff

Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit not to exceed a total of 8 semester hours. Laboratory fee, $12 a semester hour. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

Laboratory fee, $23 a semester. (Fall and spring)

FOURTH GROUP

350 **Choice and Design of a Research Problem** (1) Staff

Development in written form of an original research plan, fully referenced, and its oral defense. (Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy cumulative examinations. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Chinese

See "East Asian Languages and Literatures."

Classics

Associate Professor J.E. Ziolkowski (*Chairman*)
Associate Professorial Lecturers A.B. Seidman, Mary Norton
Assistant Professor Mary Xiroyanni
Assistant Professorial Lecturers D.B. Beers, Zvi Porath

Bachelor of Arts with a major in Classical Humanities (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—Clas 1–2, 3, 4; or equivalent; or Clas 11–12, 13–14; or equivalent; or Clas 15–16, 17–18; or equivalent; or Clas 21–22, 23–24; or equivalent, and Clas 64, 71, 72.
3. Required courses in the major—(a) 12 semester hours selected from second-group Classics courses; (b) 18 semester hours selected from Art 101, 102, 103, 111; Hist 105, 108, 109, 110, 111; Phil 111; PSc 117; Rel 9, 10.

Bachelor of Arts with a major in Latin (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—Clas 1–2, 3, 4; or equivalent.
3. Required courses in related areas—Art 111; Hist 109, 110; and either Hist 105 or Phil 111. (A reading knowledge of French and German is recommended.)
4. Required courses in the major—20 semester hours in second-group Latin courses, including Clas 131–32, 138.

Bachelor of Arts with a major in Classical Archaeology and Classics (Departmental).—An interdepartmental major arranged in conjunction with the Department of Art. The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Natural and Mathematical Sciences.)
2. Prerequisite courses—Clas 1–2, 3, 4; or Clas 11–12, 13–14.
3. Required courses in the major—Art 101, 102, 103, 111; Hist 109, 110; 14 semester hours in second-group courses in Greek or Latin, including Class 138. (A reading knowledge of French and German is recommended.)

Master of Arts in the field of Classical Archaeology, Classics, and History (an interdepartmental degree program offered by the departments of Art, Classics, and History).—Prerequisite: a Bachelor's degree with a background in Classical Archaeology and either Greek or Latin. Applicants from other institutions must present scores on the Graduate Record Examination to the Office of the Graduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. The program of study consists of 24 semester hours of course work (as many as possible should be third-group courses) selected in consultation with the appropriate adviser from the departments of Art, Classics, and History; plus a thesis (equivalent to 6 additional semester hours). Candidates must pass a reading knowledge examination in French or German. All candidates are required to pass a general Master's Comprehensive Examination.

LATIN AND GREEK

FIRST GROUP

1–2 Beginning Latin (3–3) Ziolkowski

Grammatical essentials of the language, appropriate reading selections

development of English derivatives, introduction to Roman life and literature. (Academic year)

3 **The Life and Times of Ovid** (3) Ziolkowski

Selections from Ovid's mythological and love poetry—in Latin; discussion of the culture of the Augustan Age. Prerequisite: Clas 1–2 or equivalent. (Fall)

4 **Vergil's Aeneid** (3) Staff

Significant passages of Vergil's famous epic—in Latin; reading and discussion of the entire poem in translation. Prerequisite: Clas 3 or permission of instructor. (Spring)

11–12 **Beginning Greek: Classical** (3–3) Xiroyanni

Study of the grammar, vocabulary, and structure of Greek. Reading of selected classical authors. (Academic year 1975-76 and alternate years)

13–14 **Intermediate Greek: Classical** (3–3) Xiroyanni

Review of grammar; extensive reading of prose and poetry: e.g., Homer, Herodotus, or a play. (Academic year 1976–77 and alternate years)

15–16 **Beginning Greek: Modern** (3–3) Xiroyanni

Study of Modern Greek with conversation, composition, and reading of selected passages from contemporary Greek authors. (Academic year 1976–77 and alternate years)

17–18 **Intermediate Greek: Modern** (3–3) Xiroyanni

Review of grammar, conversation; extensive reading. (Academic year 1975-76 and alternate years)

SECOND GROUP

109–10 **Major Latin Authors** (3–3) Norton

Selections from one or two major authors will be read each semester. May be repeated for credit. Prerequisite: Clas 3–4 or permission of instructor. (Academic year)

131–32 **Latin Prose Composition** (1–1) Staff

Exercises in Latin prose composition for all students who have had at least one year of college Latin.

134 **Medieval Latin** (3) Andrews

Selections from the Vulgate and representative Latin writers through the 11th century. Prerequisite: Clas 3, 4; or permission of instructor. May be taken for graduate credit with approval of instructor. (Spring)

139–40 **Major Greek Authors** (3–3) Xiroyanni

Selections from a wide variety of Greek prose, drama, and poetry, suited to the needs of the class. May be repeated for credit with permission of instructor. Prerequisite: Clas 14. (Academic year)

141–42 **Greek Prose Composition** (1–1) Staff
Exercise in Greek prose composition. Prerequisite: Clas 12 and permission of instructor. (Academic year)

185–86 **Directed Reading** (1, 2, or 3) Staff
Reading of material in the student's field of interest. Admission by permission of instructor.

THIRD GROUP

201 **Greek Epigraphy** (3) Xiroyanni
Readings in Greek epigraphical texts. May be repeated for credit with permission of instructor. Prerequisite: at least two years of college Greek. (Fall)

COURSES IN ENGLISH TRANSLATION

FIRST GROUP

64 **Greek and Latin Origins of English Words** (3) Staff
Study of Greek and Latin roots in English to improve vocabulary and facilitate understanding of the language of science, philosophy, politics, etc. Survey of the historical contact between Latin and English.

71 **Survey of Greek Literature** (3) Xiroyanni
Survey of important works in Greek literature from Homer to Lucian. Study of Greek literature in its historical context, emphasis on various literary genres. Students who receive credit for Clas 105 cannot receive credit for Clas 71. (Fall)

72 **Survey of Latin Literature** (3) Staff
Survey of Latin literature from the third century B.C. to the Renaissance. Extensive readings from Plautus, Catullus, Cicero, Horace, Vergil, Tacitus, and Petronius; selections from Medieval and Neo-Latin authors. (Spring)

SECOND GROUP

105 **Survey of Classical Humanities** (3) Norton
Representative masterpieces of Greek and Roman literature: epic, lyric, dramatic, philosophical, and historical. Students who receive credit for Clas 71 cannot receive credit for Clas 105.

108 **Classical Mythology** (3) Norton
Mythology of the Greeks and Romans from the creation of the world: tales of the gods, heroes, and great families that have influenced literature, art, and music. (Fall)

113 **Greek and Roman Drama** (3) Staff
Selected masterpieces of Greek and Roman tragedy and comedy. (Spring)

127 **Classical Influence on Western Civilization** (3) Ziolkowski

A survey of Greek and Roman influence on Western civilization relevant to modern America: literature, art, law, science, philosophy, etc. Prerequisite: at least one 3-semester-hour survey course in Greek or Roman literature. (Spring)

138 **Seminar: Classical Studies** (3) Beers

Survey of the broad range of sources and resources involved in pursuing classical studies: standard references, periodicals, library holdings, papyrology, textual criticism, history of classical scholarship.

170 **Women in Classical Antiquity** (3) Norton

In-depth study and discussion of readings from ancient and modern sources on the role of women in Greek and Roman society.

HEBREW

FIRST GROUP

21–22 **Beginning Hebrew** (3–3) Staff

Elementary Hebrew grammar, readings from the Old Testament and contemporary literature, composition and conversation. (Academic year)

23–24 **Intermediate Hebrew** (3–3) Porath

Review of grammar; continued development of reading comprehension, composition, and conversation. (Academic year)

SECOND GROUP

103–4 **Advanced Hebrew** (3–3) Seidman

Readings in poetry, prose, Mishnaic Hebrew; survey of Semitic changes and origins; Biblical comparison with Dead Sea Scrolls; required research paper in Hebrew. (Academic year)

Drama

See "Speech and Drama."

East Asian Languages and Literatures

Professor Chung-wen Shih (*Chairman*)
Associate Professorial Lecturers Jane Evans, Thomas Lawton
Assistant Professors G.C.Y. Wang, D.L. Lee, M.S. Duke

Bachelor of Arts with a major in Chinese Language and Literature in Columbian College of Arts and Sciences (Field-of-Study).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89, including Chin 1–2, 3–4, and 9; or Chin 7–8 and 9; or Chin 5–6 (preferred).

2. The completion of Chin 11–12, 109–10, 163–64, and the passing of the major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be examined includes an active command of modern Chinese language and a general knowledge of Chinese literature and culture. A proseminar (Chin 199–200) assists the student in preparation for the major examination.

Bachelor of Arts with a major in Chinese Language and Literature in the School of Public and International Affairs.—See pages 166–70.

Bachelor of Arts with a major in East Asian Studies (China and Japan).—See pages 166–70, 171.

CHINESE

FIRST GROUP

Wang

***1–2 Beginning Mandarin Chinese, Level I** (3–3)

Classroom (3 hours), laboratory (1 hour). Fundamentals of grammar and pronunciation with graded reading and practice in writing. Prerequisite to Chin 2: Chin 1. Laboratory fee, $17.50 a semester. (Academic year)

Wang

***3–4 Beginning Mandarin Chinese, Level II** (3–3)

Classroom (3 hours), laboratory (1 hour). Continuation of grammar and spoken Chinese with more emphasis on the written language and reading. Prerequisite to Chin 3: Chin 2 or equivalent. Prerequisite to Chin 4: Chin 3. Laboratory fee, $17.50 a semester. (Academic year)

Lee

5–6 Beginning Intensive Mandarin Chinese, Levels I-II (8–8)

Intensive beginner's course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Prerequisite to Chin 6: Chin 5. Laboratory fee, $17.50 a semester. (Academic year)

Lee

***7–8 Beginning Intensive Mandarin Chinese** (6–6)

Intensive beginner's course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Prerequisite to Chin 8: Chin 7. Laboratory fee, $17.50 a semester.

Wang

***9 Beginning Mandarin Chinese, Level II** (4)

Reading of simple modern expository writings. Analysis of syntactic structure and practice in writing. Prerequisite: Chin 4 or 8. Laboratory fee, $17.50. (Fall or spring)

Staff

11–12 Intermediate Intensive Mandarin Chinese (6–6)

Reading basic texts, writing short pieces, conversation, systematic review of grammar. Prerequisite to Chin 11: Chin 6 or 9. Prerequisite to Chin 12: Chin 11. Laboratory fee, $17.50 a semester. (Academic year)

* The combination of Chin 1–2, 3–4, and 9, or the combination of Chin 7–8 and 9, is equivalent to Chin 5–6.

91–92 **East Asian Literature—in Translation** (3–3) Staff

Lecture and discussion. Survey of Chinese and Japanese literature, from earliest periods through literary masterpieces of the early 20th century.

SECOND GROUP

107–8 **Readings in Modern Chinese** (3–3) Shih

(Chin 107–8 replaces former Chin 103 [6])

Intensive readings in selected modern literary works, social science materials, and documentary materials. Prerequisite: Chin 12 or equivalent. (Academic year)

109–10 **Introduction to Classical Chinese** (3–3) Shih

(Chin 109–10 replaces former Chin 105 [6])

Introduction to classical writing in Chinese literature, history, and philosophy. Prerequisite: Chin 6 or 9. (Academic year)

123–24 **Introduction to Chinese Linguistics** (3–3) Staff

Introduction to the history of the Chinese language. Analysis of linguistic structure of modern spoken Chinese and classical Chinese. Prerequisite: Chin 6 or equivalent, or a course in linguistics.

161–62 **Introduction to Chinese Culture** (3–3) Duke

(Chin 161–62 replaces former Chin 161 [3])

Survey of the Chinese cultural heritage—literature, philosophy, art, religion, and social history—from pre-history to the modern era. Lecture and discussion in English. (Academic year)

163–64 **Chinese Literature in Translation** (3–3) Duke

(Chin 163–64 replaces former Chin 166, Chinese Poetry in Translation [3], and Chin 167, Chinese Fiction in Translation [3])

Lectures focusing on major works of poetry, drama, and the novel in their historical and social context. An introductory course. (Academic year)

171–72 **Poetry of the T'ang and Sung Periods** (3–3) Staff

Reading of works of leading poets. Discussion of content and style. Prerequisite: Chin 12 or equivalent.

173 **Yuan Drama** (3) Shih

Readings of plays by Kuan Han-ch'ing, Ma Chih-Yüan, Cheng Kuang-tsu, Po P'u, and Wang Shih-fu. Prerequisite: Chin 12 or equivalent.

177–78 **Prose Narratives of the Sung, Ming, and Ch'ing Periods** (3–3) Staff

Short stories of the Sung period. Selected readings of Ming-Ch'ing novels. Historical development and stylistic traits. Prerequisite: Chin 12 or equivalent.

179–80 **20th Century Chinese Literature** (3–3) Shih

Short stories of Lu Hsün, Lao She, and others. Informal essays by Lu Hsün, Chou Tso-jen, and Chu Tze-ch'ing. Drama of T'ien Han and Ts'ao Yü. Prerequisite: Chin 12 or equivalent.

185–86 **Directed Reading (3–3)** Staff

Reading of material in the student's field of interest. Admission by permission of instructor. (Academic year)

199–200 **Proseminar: Readings for the Major in Chinese Language and Literature (3–3)** Staff

Conferences and group discussions. (Academic year)

JAPANESE

FIRST GROUP

21–22 **Beginning Intensive Japanese (8–8)** Staff

Intensive beginner's course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Prerequisite to Jap 22: Jap 21. Laboratory fee, $17.50 a semester. (Academic year)

Economics

Professors J.W. Kendrick, C.T. Stewart, Jr. (*Chairman*), C.E. Galbreath (*Emeritus*), Joseph Aschheim, R.P. Sharkey, Henry Solomon, Sar Levitan, Louis De Alessi, Theodore Suranyi-Unger, Jr. (*Research*), Ching-Yao Hsieh, J.L. Gastwirth, W.A. Johnson (*Research*), Mary Holman
Adjunct Professors T.F. Carroll, Joseph Grunwald, J.L. Fisher
Professorial Lecturers John Hardt, Eleanor Hadley
Associate Professors R.Y.C. Yin, W.F.E. Long, S.E. Haber, R.M. Dunn, Jr., G.C. Eads, R.S. Goldfarb, J.R. Barth
Adjunct Associate Professor Edward Gramlich
Associate Professorial Lecturers R.A. Musgrove, S.S. Sutton
Assistant Professors A.M. Yezer, Richard Sines
Assistant Professorial Lecturers L.L. Perez, T.R. Robinson

Bachelor of Arts with a major in Economics (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Humanities and the Natural and Mathematical Sciences.)
2. Prerequisite course—Econ 1–2.
3. Required courses in related areas—Math 51 and 52, or equivalent; Stat 111 and 112, or equivalent; 6 semester hours of a Social Study other than Economics.
4. Required courses in the major—Econ 101, 102, 121, 198, and 15 additional semester hours of second-group Economics courses to be approved by the departmental adviser.

Master of Arts in the field of Economics.—Prerequisite: a Bachelor of Arts degree with a major in Economics from this University, or an equivalent degree.

Required: the general requirements, pages 93–100, including (1) Econ 203–4, 205, 379; (2) 12 additional semester hours to be selected from other third-group Economics courses; (3) a Master's Comprehensive Examination in economic theory; (4) completion of a tool requirement (either the passing of a reading knowledge examination in one foreign language or the satisfactory completion of one of the following courses: Math 124, Stat 97, or Stat 157–58); and (5) either a thesis (Econ 399–300) or 12 semester hours selected from additional third-group Economics courses.

Doctor of Philosophy in the field of Economics.—Required: the general requirements, pages 93–97, 100–102, including (1) Econ 202, 203–4, 205, 215–16, 379 or 380, and 24 additional semester hours of approved graduate course work including Econ 279; (2) passing of the General Examination in Microeconomic Theory, Macroeconomic Theory, and two other fields selected by the student and approved by the doctoral program committee; (3) completion of the tool requirement (the passing of a reading knowledge examination in one foreign language plus the satisfactory completion of Math 124, Stat 97, or Stat 157–58; and (4) a dissertation to demonstrate the candidate's ability to do original research in one of the following fields: Econometrics, Economic Development, Economic History, Economic Policy, Economic Theory, Environmental Economics, History of Economic Thought, Industrial Organization, International Economics, Labor Economics, Mathematical Economics, Monetary Economics, National Income Accounting, Natural Resources Economics, Public Finance, Regional and Urban Economics, and Soviet Economics.

Departmental prerequisite: Econ 1–2 is prerequisite to all other courses in Economics except Econ 217–18.

FIRST GROUP

1–2 Principles of Economics (3–3) Staff

Lecture (2 hours), recitation (1 hour). Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2. (Econ 1 and 2—fall and spring)

SECOND GROUP

101 Intermediate Microeconomic Theory (3) Eads, Yin

Analysis of supply, demand, and pricing. (Fall and spring)

102 Intermediate Macroeconomic Theory (3) Holman, Yin

Theories of national income determination and growth. (Fall and spring)

104 History of Economic Thought (3) Hsieh

History of the major schools of economic thought, influence of changing problems on the development of economic theory. (Spring)

105 Economic Conditions Analysis and Forecasting (3) Kendrick

Theory and empirical analyses of economic trends and fluctuations, use of economic indicators and simple econometric models, workshop experience in an analysis of an aspect of the U.S. economy. (Fall)

121 Money and Banking (3) Barth

Nature of money, credit, commercial banking, and other financial institutions in the U.S. monetary system. (Fall and spring)

122 **Monetary Theory and Policy** (3) Barth

Analysis of role of money in economic activity in terms of supply of and demand for loanable funds, interest rates and price level. Problems of U.S. monetary policy. Prerequisite: Econ 121. (Spring)

*123 **Introduction to Econometrics** (3) Bennett

Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques applicable to economic models. Prerequisite: Econ 101, 102; Math 31 or 51; Stat 111. (Spring)

130 **Comparative Economic Systems** (3) Aschheim, Yin

Critical exposition of fundamental economic concepts and theories of capitalism, communism, socialism, and fascism.

133 **Economy of the Soviet Union** (3) Hardt

Development and main features of economic life in the Soviet Union. (Fall)

134 **Comparative Communist Economic Systems** (3) Hardt

Analysis of economic development and performance of the Soviet Union and other Soviet-type economies. Institutional aspects and quantitative measures of performance. (Spring)

136 **Natural Resources and Environmental Economics** (3) Yezer

Analysis of market mechanisms for allocating energy and natural resources; cases of market failure in the use of the environment; policies to improve resource allocation using market and regulatory strategies. (Spring)

142 **Labor Economics** (3) Haber

Analysis of the supply and demand for labor and the functioning of labor markets; unemployment; wage determination and wage differential; poverty. (Fall)

†147 **Economic History of Europe** (3) Sharkey

European economic development since the Middle Ages; emphasis on the period following the Industrial Revolution. Evolution of capitalism and its impact upon the societies of Europe. (Spring)

‡153 **Poverty in America** (3) Yezer, Boeckmann

Exploration of social and economic causes of poverty in the United States and evaluation of present and proposed anti-poverty strategies, including comprehensive welfare reform. Discussion of conflicts between sociological and economic models of behavior of low income groups.

157 **Urban and Regional Economics** (3) Yezer

Analysis of the determinants of urban growth and development; firm location; the functioning of urban land and housing markets.

---

* Interdepartmental course offered by the departments of Economics and Statistics.
† Interdepartmental course offered by the departments of Economics and History.
‡ Interdepartmental course offered by the departments of Economics and Sociology.

158 **Industrial Organization** (3) Eads

Analysis of the structures and production, pricing, and related practices of industries with emphasis on their significance and on appropriate economic policies. (Spring)

160 **Social and Economic Indicators** (3) Staff

161 **Public Finance I** (3) Staff

Theoretical and institutional analysis of government expenditures, taxation, and intergovernmental fiscal relations. (Fall)

162 **Public Finance II** (3) Staff

Theoretical and institutional analysis of fiscal policy and debt management. (Spring)

165 **Economics of Human Resources** (3) Stewart, Goldfarb

Economic analysis of education and training, health care, and other contemporary problems. (Fall)

169 **Introduction to the Economy of Communist China** (3) Yin

Background, organization, and operation of the economy. Appraisal of performance and analysis of problems of development. (Fall)

170 **Introduction to the Economy of Japan** (3) Hadley

Analysis of the structure and growth of the Japanese economy. (Spring)

*179–80 **U.S. Economic History** (3–3) Sharkey

Process of economic growth from Colonial times to the present. Development of various sectors in the economy and their interdependence. Econ 179: 1607–1865. Econ 180: 1865 to present. (Academic year)

181–82 **International Economics** (3–3) Dunn

Econ 181: international trade theory and international monetary theory. Econ 182: continuation of international monetary theory; economic development. (Academic year)

185 **Economic History and Problems of Latin America** (3) Perez

Analysis of present structures and problems of Latin American economies. (Fall)

198 **Proseminar in Economics** (3) Holman, Long

Examination of major topics in economic theory and the application of theory and analysis to policy problems. Open only to economics majors in their senior year. (Fall and spring)

199 **Independent Research in Economics** (3) Staff

Under the personal direction of an instructor. Limited to economics majors with demonstrated capacity. Prior approval of instructor required. (Fall and spring)

*Interdepartmental course offered by the departments of Economics and History.

THIRD GROUP

Third-group Economics courses (except 217–18) are designed for graduate students in Economics or for graduate students with prescribed prerequisites.

202 **History of Economic Thought** (3) Hsieh

Critical analysis and interpretation of the development of economic theory from Plato through the "Keynesian Revolution" and the "Monetarist Counter-revolution."

203–4 **Microeconomic Theory** (3–3) De Alessi, Goldfarb

Econ 203: demand, production. Prerequisite: Econ 101 or equivalent. Econ 204: market structure, income distribution, intertemporal allocation, welfare economics; other topics. Prerequisite: Econ 203. (Econ 203 and 204—fall and spring)

205 **Macroeconomic Theory** (3) Hsieh, Barth

Theories of income determination, the price level, economic fluctuations, and economic growth. (Fall and spring)

207 **Business Cycle Analysis** (3) Kendrick

Empirical analysis of American business cycles; evaluation of the methodology and findings of the National Bureau of Economic Research. Statistical tests of theories of the business cycle. (Spring)

208 **National Income** (3) Kendrick

Theory and measurement of economic aggregates within an integrated national income accounts framework, including balance sheets and wealth statements. (Spring)

210 **Economic Methodology** (3) Stewart

Methodology of economics, review of selected theoretical issues in economic theory. Prerequisite: 6 semester hours of graduate courses in economic theory. (Spring)

212 **Economics of Property Rights** (3) De Alessi

Application of microeconomic theory to decision-making within business and government organizations subject to alternative institutional constraints. Prerequisite: Econ 101. (Spring)

215–16 **Mathematical Economics** (3–3) Sines

Formulation and application of mathematical models in economic theory. Prerequisite: a one-year calculus sequence. Open to undergraduates. (Academic year)

217–18 **Survey of Economics** (3–3) Holman

For graduate students in fields other than economics. Econ 217: price theory. Econ 218: income and employment theory. Departmental prerequisite waived. (Econ 217 and 218—fall and spring)

223–24 **Monetary Theory and Policy** (3–3) Aschheim

Theory of monetary policy within the framework of contemporary American central banking. (Academic year)

233 **Seminar: Agrarian Reform and Development in Latin America** (3) — Carroll

Analysis of Agrarian reform movements and programs in the context of current development issues in Latin American countries. (Fall)

234 **Seminar: Evaluation of Rural Development Projects in Latin America** (3) — Carroll

Review of criteria for the design and evaluation of rural investment projects; case studies drawn from the experience of development agencies. (Spring)

235 **Energy Resources and Policy** (3) — Fisher

Consideration of economic and related policy issues directed at energy problems.

237 **Seminar: Economics of the Environment and Natural Resources** (3) — Holman

Analysis of public policy problems relating to the environment and natural resources development and management. (Spring)

241–42 **Labor Economics** (3–3) — Haber

Analysis of labor markets, theories of wages, impact of collective bargaining, causes of unemployment, public policies and programs. (Academic year)

243 **Seminar: Manpower Policy** (3) — Levitan

Developments leading to expansion of public investment in manpower resources; evaluation of goals and operations of publicly supported programs. (Fall)

244 **Economics of Educ̣ation** (3) — Staff

Returns to investment in education, allocation of resources to and within education, educational financing.

245–46 **Industrial Organization** (3–3) — Eads, Long

Structure and performance of the American economy; emphasis on the economics of antitrust policy and the impact of government regulatory policies. (Academic year)

247 **Seminar: Industrial Organization** (3) — Long, Eads

Selected topics in regulatory economics and in antitrust economics during alternate years. Topic for 1976: Antitrust Problems. Prerequisite: Econ 101 or equivalent. (Spring)

251–52 **Economic Development** (3–3) — Grunwald

Theories and problems of economic growth; special attention to the underdeveloped countries. (Academic year)

253 **Productivity Analysis** (3) — Kendrick

Concepts, measurement, and analysis of productivity in business and government at aggregate and organizational levels. (Fall)

Eads

255 Economics of Technological Change (3)

Economic principles related to determining the proper federal role in influencing civilian-oriented technological change. (Fall)

Stewart, Yezer

257 Regional Economics (3)

(Econ 257 and 258 replace former Econ 257, Regional and Urban Economics [3])

Analysis of firm location, patterns of interregional or intermetropolitan production, urban and regional growth and patterns of development. (Fall)

Stewart, Yezer

258 Urban Economics (3)

(Econ 257 and 258 replace former Econ 257, Regional and Urban Economics [3])

Analysis of spatial relationships among economic activities within an urban area including the urban land, labor, and housing markets; urban transportation models; fiscal relationships among jurisdictions. Prerequisite: Econ 257 or permission of instructor. (Spring)

Staff

259 Income Distribution (3)

Theoretical and empirical analysis of income distribution, including analysis of policies related to income inequality. Open to advanced undergraduate Economics majors. (Fall)

Stewart

261 Welfare Economics (3)

Theories of welfare economics and their applications to public policy, analysis of selected topics in public policy. (Fall)

Gramlich

263 Theory of Public Finance I (3)

Allocation and distribution aspects of government budget policy, including critical analysis of theories and principles of expenditures, taxation, and intergovernmental fiscal relations. (Fall)

Gramlich

264 Theory of Public Finance II (3)

Stabilization aspects of government budget policy: analysis of effects of fiscal policy and debt management on level of employment, prices, and rate of economic growth. (Spring)

Hardt

267 Seminar: Soviet Economy (3)

Development of the Soviet-type economy. Organization, policies, and problems: monetary, production, allocative, foreign trade, economic growth. Admission by permission of instructor. (Fall)

Hardt

268 Seminar: Economic Theory and Development in Communist Countries (3)

Appraisal of the Soviet model for economic development in the communist world, especially in Eastern Europe and China. Admission by permission of instructor. (Spring)

Yin

269 Economy of Communist China I (3)

Analysis of organization, operation, policies, and problems. Development of the economy under communism. (Fall)

270 **Economy of Communist China II** (3) Yin

Continuation of Econ 269, examining critical problems of development. Prerequisite: Econ 269 or permission of instructor. (Spring)

271 **Economy of Japan** (3) Hadley

Analysis of Japanese economic institutions and their contribution to Japan's development. (Fall)

*275 **Econometrics I: Introduction** (3) Bennett

Single equation models of economic behavior. Statistical methods for testing economic hypotheses and estimating parameters. Introduction to simultaneous equations problems. Prerequisite: Stat 157–58 or equivalent, or permission of instructor. (Fall)

*276 **Econometrics II: Simultaneous Equation Models** (3) Bennett

Economic models and simultaneous equations systems. Prerequisite: Econ 275. Recommended: a course in matrix theory. (Spring)

*279 **Methods in Economic Statistics** (3) Gastwirth

Application of statistical methods to economics. Curve-fitting, regression, analysis of variance, and chi-square techniques used to analyze economic data. Prerequisite: a one-year course in statistics. (Fall and spring)

281–82 **International Economics** (3–3) Dunn

Econ 281: theory of international trade and factor movements. Econ 282: theory of balance-of-payments adjustment. (Academic year)

287 **Seminar: Problems in Latin American Civilization** (3) Staff

Interdisciplinary seminar partially guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspect of a selected key theme. Admission by permission of instructor. (Spring)

298 **Reading and Research** (3)

Limited to Master's degree candidates. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

Fourth-group Economics courses are limited to graduate students and are primarily for doctoral candidates. They are offered as the demand requires.

305 **Seminar: Macroeconomics** (3) Staff

Selected topics in macroeconomics. Prerequisite: Econ 205.

312 **Seminar: Price Theory** (3) De Alessi

Discussion of topics of price theory from recent journal articles.

313 **Seminar: Economic Thought** (3) Hsieh

Continuation of Econ 202. Principal trends in economic thought.

* An interdepartmental course offered by the departments of Economics and Statistics.

315 **Seminar: Topics in Mathematical Economics** (3) Solomon
Intensive study of selected topics, including economic activity analysis, risk and uncertainty, and other topics of current interest. Prerequisite: Econ 215–16.

321 **Seminar: Monetary Theory** (3) Aschheim
Recent developments in monetary theory.

341 **Seminar: Labor Economics** (3) Staff
Current problems in theory and policy.

363 **Seminar: Public Finance** (3) Staff
Selected topics of current interest.

*378 **Seminar: Topics in Econometrics** (3) Staff
A research seminar covering current econometric literature and special topics. Admission by permission of instructor.

†379–80 **Readings in Economic History** (3–3) Sharkey
Econ 379: American economic history. Econ 380: modern European economic history. Prerequisite: the appropriate second-group preparation and consent of instructor. (Academic year)

390 **Seminar: International Economic Theory** (3) Staff
Limited to graduate students, primarily for doctoral students. Examination of recent contributions in this field.

391 **Seminar: International Economic Policy** (3) Staff
Topics selected from current significant policy problems.

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Education

Professors W.T. Carroll, Carol St. Cyr, Mary Ellen Coleman, Daniel Sinick, R.E. Baker, Martha Rashid, Rodney Tillman, Anthony Marinaccio, L.H. Elliott, Leonard Nadler, Marcella Brenner, J.G. Boswell, C.E. Vontress, R.J. Frankie

Professorial Lecturers W.W. Chase, D.D. Darland, Allan Drexler, E.J. Gleazer, Jr., F.W. Kovacs, P.P. Muirhead

* An interdepartmental course offered by the departments of Economics and Statistics.
† An interdepartmental course offered by the departments of Economics and History.

sociate Professors Margaret McIntyre, Dorothy Moore, Lawrence Winkler, Donald Linkowski (*Chairman*), E.P. Kulawiec, Gloria Horrwoth, Ruth Peterson, G.D. Wiggs

sociate Professorial Lecturers Martha Ware, David Iwamoto, Samuel Kavruck, John Woodburn, A.C. Jensen, E.F. Rhodes, S.R. Paratore

sistant Professors G.W. Smith, J.A. Kuhagen (*Research*), Janet Heddesheimer, Charles Reeder (*Research*), J.A. Greenberg, Linda Tsantis

sistant Professorial Lecturers R.J. Kubalak, J.D. Gates, Marianne Phelps, R.E. McNelis, Sally Boss, D.G. Speck, Carla Heymsfeld, F.V. Corrigan, Mary Duff, E.J. Fenney, F.A. Goss, D.H. Reddick

structor Sue Hoth (*Research*)

Programs of study leading to the degrees of *Bachelor of Arts in Education, Mas- of Arts in Education, Master of Arts in Teaching, Education Specialist,* and *ctor of Education* are offered by the School of Education (see pages 105–32).

COND GROUP

duc 136, 137, 138, 139, 140, 142, 144, and 146 are special methods courses which e to be elected in the senior year by students in the secondary school curriculum er substantial preparation in the teaching fields concerned. Course requirements d hours of credit vary with license requirements. Practices of successful teachers died; actual teaching content as found in current texts and courses of study reewed. Prerequisite to all special methods courses: Educ 108, 123, and 131. Addinal prerequisites are stated under each course.

108 **Human Development, Learning, and Teaching** (3) Staff

Lecture (2 hours), field work (3 successive hours each week, preferably in the morning, arranged by the Director of Laboratory Experiences). Principles of effective teaching based on an understanding of human development and the nature of learning. Prerequisite: Psyc 22; Psyc 29 or 112. (Fall and spring)

111 **Elementary School Curriculum and Methods** (15) Moore and Staff

For seniors. Curriculum and methods of teaching in the elementary school: reading, children's literature, mathematics, science, language arts, social studies, music, art, physical education. Pre-student teaching one and one-half days a week. Prerequisite: Educ 108 and 123. (Fall)

112 **Educational Measurement** (3) Staff

Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123. (Fall and spring)

113 **Elementary School Art** (3) Staff

Lecture and laboratory (3 hours), field work—as arranged. For undergraduates in the elementary school curriculum. Materials and methods. Material fee, $5. (Spring)

114 **Elementary School Music** (3) Staff

For undergraduates in the elementary school curriculum. Program of music activities essential to basic musical understanding. Materials and techniques.

115 **Elementary School Teaching of Reading** (3) Staff

Introduction to methods, techniques, materials, and activities essential to a good elementary school reading program. Prerequisite: Educ 108 and 123, or teaching experience.

118 **Elementary Reading: Classroom Diagnosis and Instruction** (3) Staff

Emphasis on diagnostic procedure aimed at individualizing and improving classroom instruction. Prerequisite: Educ 115 or equivalent. Concurrent registration in Educ 119 required for students in the M.A.T. in elementary education degree program. (Fall and spring)

119 **Elementary School Curriculum and Methods** (9) Horrworth and Staff

Limited to students in the M.A.T. in elementary education degree program. Curriculum, methods, and materials of reading, language arts, social studies, mathematics, science, music, art and physical education. Appropriate field experience coordinated during elementary school fall openings. Concurrent registration in Educ 118 required. (Fall)

123 **Society and the School** (3) Boswell and Staff

Historical and social development of education, contemporary issues, cooperation of the school with other community agencies, functions of school personnel. (Fall and spring)

124 **Communication Skills and Interpersonal Relationships** (3) Brenner

Theory and practice in the development of professional relationships: teacher-child, teacher-parent, teacher-supervisor, utilizing interview and other activities. (Fall)

128 **Children's Literature** (3) McIntyre

Lecture (2 hours), field work (2 hours). Newer books for children and the children's classics, contribution of literature to child development. (Spring)

130 **Internship in Elementary Education** (6) Horrworth and Staff

Limited to students in the M.A.T. in elementary education degree program. Full-time teaching in an elementary school under cooperative supervision of the school system and the University staff. Admission by permission of instructor. Prerequisite: Educ 119, 135. (Spring)

131 **Secondary School Principles and Methods** (3) Boswell, Kulawiec

For seniors. Classroom management and teaching techniques for initiating, guiding, and evaluating learning activities. Group-work to be arranged. Prerequisite: Educ 108 and 123. (Fall)

132 **Student Teaching in Early Childhood Schools** (6 to 9) McIntyre

For seniors. Admission by permission of instructor. Prerequisite: Educ 111 or equivalent; Educ 150, 152, 153. (Fall and spring)

133 **Supervised Experience in Education** (3 to 6) Staff

Field work, internship, and instructional practice: (1) adult education and human resource development (Wiggs); (2) college student development experience (Kirkbride); (3) higher education (Frankie); (4) mu

seum education (Brenner); (5) counseling (Heddesheimer). Admission by permission of instructor. (Fall and spring)

134 **Student Teaching in Secondary Schools** (6 to 9) — Boswell, Kulawiec, and Staff

For seniors. Admission by permission of instructor. Prerequisite: Educ 131. (Fall and spring)

135 **Student Teaching in Elementary Schools** (6 to 9) — Horrworth, Moore, and Staff

For seniors and for students in the M.A.T. in elementary education degree program. Admission by permission of instructor. Prerequisite for seniors: Educ 111 or equivalent. Prerequisite for M.A.T. students: Educ 220. (Seniors—fall and spring; M.A.T. students—fall)

136 **Teaching English in Secondary Schools** (3) — McNelis

Lecture (2 hours), field work (2 hours). Prerequisite: 18 semester hours in English. (Spring)

137 **Teaching Speech** (3) — Staff

Lecture (2 hours), field work (2 hours). Prerequisite: 18 semester hours in speech or permission of instructor. (Spring)

138 **Teaching Social Studies in Secondary Schools** (3) — Boswell

Lecture (2 hours), field work (2 hours). Prerequisite: 24 semester hours of social studies. (Spring)

139 **Teaching Art in Secondary Schools** (3) — Staff

Lecture (2 hours), laboratory (2 hours). Prerequisite: 24 semester hours of Art. Material fee, $5. (Spring)

140 **Teaching Mathematics in Secondary Schools** (3) — Gates

Lecture (2 hours), field work (2 hours). Prerequisite: mathematics through calculus. (Spring)

142 **Teaching Music in Secondary Schools** (3) — Staff

Prerequisite: 24 semester hours of music.

144 **Teaching Science in Secondary Schools** (3) — Kulawiec

Lecture (2 hours), field work (2 hours). Prerequisite: 24 semester hours of science. (Spring)

146 **Teaching Foreign Languages** (3) — Kulawiec

Lecture (2 hours), field work (2 hours). Prerequisite: 18 semester hours of one foreign language. (Spring)

150 **Foundations of Early Childhood Education** (3) — McIntyre

Historical developments, philosophy, and objectives of nursery schools, kindergartens, and day care centers; exploration of contemporary programs and models with curriculum implications. Admission by permission of instructor. (Fall)

McIntyre

152 **Early Childhood Curriculum** (3)

Content, approaches, methods, and materials in language arts, mathematics, science, health, social studies, and creative arts. Admission by permission of instructor. (Fall)

McIntyre

153 **Role of the Professional in Early Childhood Education** (3)

Planning, reporting, records, teacher-child and teacher-family interaction, diagnosis and evaluation, working with paraprofessionals. Admission by permission of instructor. (Spring)

McIntyre

154 **Community Resources and Materials for the Young Child** (3)

Interaction with community for services and resources; physical facilities, including play activities and curriculum materials for the young child. Admission by permission of instructor. (Spring)

THIRD GROUP

Departmental prerequisite: A degree from an accredited institution is prerequisite to all third-group courses in Education. Adequate professional preparation is prerequisite to all third-group courses in Education except for those courses limited to students in the M.A.T. degree program.

Moore

201–2 **Seminar: International Education** (3–3)

Survey of selected foreign educational systems and cultures. Research techniques, and materials to develop world-mindedness. Embassy resources utilized.

Kulawiec

203–4 **Comparative Education** (3–3)

A systematic investigation of the educational structure and practices of selected representative school systems throughout the world. Emphasis on development of a methodology for comparative study.

St. Cyr

205–6 **The Curriculum** (3–3)

For experienced teachers. Educ 205: curriculum foundations and issues, comparison of curriculum patterns. Educ 206: curriculum development in subject areas, group consideration of student problems. (Academic year)

St. Cyr

207 **Curriculum Materials** (3 to 6)

For experienced teachers. Construction of courses of study and classroom teaching aids, with direct application to students' situations.

Rashid

208 **Human Development** (3)

Consideration of human development and behavior throughout the life span; emphasis on practical implications of relevant interdisciplinary research. (Fall and spring)

Rashid

209 **Child Development** (3)

Interdisciplinary approach to child development and behavior. Practical implications of research in disciplines contributing to knowledge about childhood. (Fall and spring)

210 **Adolescent Development** (3) Rashid

Interdisciplinary approach to adolescent development and behavior. Practical implications of research in disciplines contributing to knowledge about adolescence. (Spring)

212 **Quantitative Methods I: Measurement** (3) Paratore, Smith, and Staff

Basic measurement techniques; selection, administration, and interpretation of standardized tests; construction, selection, and interpretation of questionnaires, personality inventories, and other data-gathering instruments used in research. (Fall and spring)

213–14 **History of Education** (3–3) Frankie

Educ 213: European backgrounds of American education. Educ 214: evolution of the American school system. (Academic year)

216 **Education of Slow-learning Children** (3) Staff

Identification, nature, and needs of slow-learning elementary and junior high school children. Emphasis on diagnosis and treatment of learning difficulties.

217–18 **Philosophy of Education** (3–3) Darland

Educ 217: to help students formulate a personal philosophy of education. Educ 218: social foundations of education—forces that shape policies and offerings of the school. (Academic year)

219 **Elementary School Classroom Procedures** (3) Baker

Current theories of teaching and learning and their application to teaching acts and strategies of elementary school teachers.

220 **Elementary School Teaching Foundations** (9) Horrworth and Staff

Limited to students in the M.A.T. in elementary education degree program. Introductory block course dealing with the content of professional education courses: history and philosophy of education; educational psychology; human development, learning, and teaching; society and the school; elementary school organization. 160 class hours supplemented by field experience.

223 **Foundations of Reading Instruction** (3) Coleman

Historical and psychological background; evaluation of recent methods, materials, and techniques in teaching reading; demonstrations of diagnostic and teaching techniques. Specific areas to be announced in the *Schedule of Classes*. (Fall)

224 **Diagnostic Teaching of Reading** (3) Coleman

Elementary school reading difficulties; classroom and clinical techniques in testing and teaching. Prerequisite: one or more years of recent teaching experience and a previous course in reading or language arts. (Spring)

226 **Reading in Secondary School and College** (3) Coleman

Methods, techniques, and materials necessary for testing and developing efficient reading skills, including skills in content subjects; organizing and evaluating reading programs. (Spring)

227 **Basic Issues in Elementary Education** (3) Baker
Identification, definition, and analysis of some of the most important problems facing the contemporary American elementary school. (Fall)

228 **Instructional Areas in Elementary Education** (3) Baker
Current trends and research on reading, language arts, social studies, mathematics, science, music, art, and physical education. (Spring)

229 **Administration of Elementary Education** (3) Carroll
For experienced teachers and administrators. Achieving instructional objectives, organizing and servicing teaching activities, coordinating school and community life. (Fall)

230 **Intern Seminar for M.A.T. Students** (3) Horrworth (Spring)
Planning and supervision of individual action research projects.

231 **Secondary School Classroom Procedures** (3) Boswell
Current classroom practices: teacher-pupil planning, group procedures, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature.

232 **Supervision of Elementary Education** (3) Carroll
For experienced teachers and administrators with two or more years of teaching experience. Review of modern supervisory concepts, including practices in the operation of the elementary school. (Spring)

233 **Audio-visual Education** (3) Kubalak
Lecture (2 hours), laboratory (1 hour). Selection, evaluation, and use of audio-visual materials; administrative problems in care, operation, maintenance, and use of such materials and equipment. Material fee, $7. (Spring)

235 **Analysis of Teaching** (3) Boswell
Teaching as work: diagnosing learning skills, program planning and implementation, feedback information on both student and program. (Fall)

236 **Introduction to Education Technology** (3) Staff
Consideration of historical perspective, process, instrumentation, and implementation of self-instructional systems. (Fall)

237 **Systems Approach to Instructional Design** (3) Staff
Application of systems techniques to the development of an instructional program. (Spring)

241 **Education of the Gifted** (3) Staff
For classroom teachers. Nature and discovery of giftedness, provisions for the gifted in regular classes, experimental projects.

243 **Human Relations in Education** (3) Marinaccio
Principles and practices in human relations between and among learner, teacher, other school personnel, and parents.

245 **School and Community** (3) Marinaccio, Greenberg

The school as an important member of a team of social agencies that builds the community.

246 **Administrative Issues in Urban Education** (3) Staff

Investigation of current issues in urban education. (Fall and spring)

247 **Adult and Preprofessional Technical and Occupational Education** (3) Wiggs

Development, current concepts, agencies involved, problems, and trends in adult vocational-technical-occupational education in the United States and foreign countries.

249 **Drug Treatment and Resources** (3) Reeder

Individual, social, and cultural factors related to drug abuse. Rehabilitative methods in treating drug abusers; use of community resources. (Spring)

250 **Counseling Drug Abusers** (3) Reeder

Counseling theory and practice applied to drug abusers. Crisis intervention, self-help groups, and family therapy; individual and group counseling. (Fall)

251 **Foundations of Counseling** (3) Heddesheimer, Winkler

(Formerly Foundations of Guidance and Personnel Services)

Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues. (Fall and spring)

252 **Organization and Administration of Guidance Services** (3) Vontress

Procedure and practice in organizing and administering school guidance and pupil personnel programs. Admission by permission of instructor. (Spring)

253 **Individual Appraisal in Counseling** (3) Winkler

(Formerly Analysis of the Individual for Purposes of Counseling)

Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite: Educ 112 or equivalent. (Fall and spring)

254 **The Middle School** (3) Kulawiec

Development, organization, and practices; emphasis on the learner, the teacher, the administrator, the curriculum, and the setting of the school for the preadolescent. (Fall)

255–56 **Secondary Education** (3–3) Kulawiec

Examination of historical, psychological, sociological, and philosophical bases; emphasis on prescriptive implications. Special attention to contemporary problems and practices. (Academic year)

257 **Career Development and Information** (3) Sinick, Vontress

(Formerly Education and Occupational Development)

Theories of career development; factors influencing the world of work; procedures for evaluating and using socio-personal, educational, and occupational information. (Fall and spring)

258 **Theories and Techniques of Counseling** (3) Heddesheimer, Vontress
(Formerly Techniques of Counseling)
Theories and practices of vocational, educational, and personal counseling. Prerequisite: 12 semester hours in guidance and counseling, including Educ 253 and 257. (Fall and spring)

259 **Secondary School Administration** (3) Staff
For experienced teachers and administrators. Survey of administration, including practices of the modern high school. (Fall)

260 **Secondary School Supervision** (3) Staff
For experienced teachers and administrators. Review of modern supervisory concepts, including practices in schools. (Spring)

261 **Practicum in Counseling** (3) Heddesheimer, Vontress
Intensive counseling experience under supervision. Emphasis on relationship dynamics, analysis, recommendations, and follow-up. Prerequisite Educ 258. (Fall and spring)

262 **Internship: Counseling** (3) Heddesheimer
Counseling experience under University and institutional supervision in a variety of settings. Prerequisite: Educ 261. (Spring)

263 **Human Resource Development: Training and Education** (3) Wiggs, Nadler
Concepts and purpose, historical backgrounds, roles of human resource development personnel, program areas. Prerequisite: adequate professional preparation or experience in training, education, and development (Fall)

264 **Program Planning in Human Resource Development** (3) Nadler
Training, education, and development programs for various client systems will be planned using critical events conceptual model. Field work. Prerequisite: Educ 263 and permission of instructor. (Spring)

269–70 **School Business Management** (3–3) Staff
Educ 269: philosophy, responsibilities, and functions of the business management office in public education institutions. Educ 270: practicum in educational business management. (Academic year)

271 **The Teacher and School Administration** (3) Carroll
Role of federal, state, and local administrative units; school finance; legal controls; school plant; public support; improving teaching conditions. (Fall and spring)

272 **The Teacher and School Supervision** (3) Carroll, Tillman
Nature, organization, human relationships, and techniques. (Fall and spring)

273–74 **Teacher Education** (3–3) Boswell
Educ 273: aims, objectives, and basic issues; study of outstanding and experimental programs. Educ 274: recruitment and selection, general education, teaching-field preparation, professional sequences, laboratory experiences. (Academic year)

275 **Seminar: School Finance** (3) Carroll

Educational financial theory, practice, and control, including methods of financing. (Fall)

276 **Seminar: Public Relations in School Administration** (3) Carroll

Purposes, gathering materials, disseminating agencies, publicity media, public participation in policy-making. (Spring)

278 **School Law** (3) Ware

Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of major interest to the group. (Spring)

279 **Adult Education** (3) Nadler, Wiggs

Current concepts and objectives, historical development, agencies involved, personnel, clients, programs on all levels—community through international. (Fall)

280 **Program Planning in Adult Education** (3) Wiggs

Determining educational needs for adults in school and non-school agencies; planning programs and instruction; budgeting and scheduling of adult programs. Field work with sponsoring agency. Prerequisite: Educ 279 and permission of instructor. (Spring)

283 **Higher Education in the United States** (3) Frankie

History, scope, purpose, present status, programs, and trends in higher education in the United States. (Fall and spring)

284 **Administration of Higher Education** (3) Marinaccio

Government, organization, and administration of colleges and universities; duties of trustees and administrators. (Fall and spring)

285 **Student Activities** (3) Greenberg

Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student council, interscholastic contest; attention to sponsorship, participation, finance, and evaluation.

287–88 **Clinical Study of Reading Problems** (3–3) Coleman, Peterson

For advanced students. Diagnostic and corrective work under supervision in the Reading Center. Prerequisite: Educ 223 and 224 or 226, or equivalent. Material fee, $10 a semester. (Academic year)

289 **Supervisory Problems in Reading** (3) Peterson

For experienced teachers, principals, supervisors, and superintendents. Problems in planning, reorganizing, and improving the total reading program. (Fall)

290 **Severe Learning Disabilities in Reading** (3) Peterson

For experienced teachers. Case studies of children and/or adults with severe reading problems, planning and implementing instructional programs. Admission by permission of instructor. Material fee, $10. (Spring)

Chase

291 **Planning the School Plant** (3)

Selection of sites; evaluation of existing buildings; utilization of present facilities; adaptation to curricular needs; building, operation, and maintenance problems. (Fall)

Staff

293–94 **Research and Independent Study** (3–3)

Individual research under guidance of a staff member. Program and conferences arranged with an instructor. (Academic year)

Paratore, Smith, Winkler

295 **Quantitative Methods II: Research Procedures** (3)

Required of all candidates for graduate degrees in Education. Analysis of scientific approaches to problems in education; evaluation of research techniques. Prerequisite: Educ 212 or equivalent. (Fall and spring)

Carroll

297 **Personnel Administration** (3)

Organization and administration of personnel programs for educational institutions. Basic philosophy, principles, responsibilities, and functions.

Carroll

298 **Seminar: Personnel Administration** (3)

Research: policies, rules and regulations, staff organizations, negotiations.

Staff

299–300 **Thesis Research** (3–3)

Required of M.A. in Ed. degree candidates writing Master's theses. (Fall and spring)

Staff

301 **Data Processing in Education** (3)

Machine accounting and computer technology for counselors, teachers, and administrators.

Paratore, Smith

302 **Quantitative Methods III: Inferential Techniques** (3)

Educ 302 or Stat 105 is required of all doctoral students in Education. Prerequisite: Educ 295 or a basic statistics course and permission of instructor. (Fall and spring)

Linkowski

303 **Data Analysis** (3)

Use of computer in data analysis. For doctoral students at the dissertation-planning stage. (Fall)

Carroll, Tillman

304 **Practicum in Supervision** (3 to 6)

Supervised practical experience in supervision of instruction. Admission by permission of instructor.

Carroll, Tillman

305 **Internship: Supervision** (3 to 6)

Service in a school situation directed by the University and school system to integrate theory and practice.

Paratore, Smith

306 **Quantitative Methods IV: Advanced Research Design** (3)

Required of all doctoral students in Education. Evaluation and application of educational research designs. Prerequisite: Educ 302 or equivalent. (Fall and spring)

310 **Museum Studies** (3) Hoth

Limited to students in the M.A.T. program in Museum Education. Study of museums' functions and their relationship to museum educational roles.

311 **Museum Audiences** (3) Brenner

Limited to students in the M.A.T. program in Museum Education. Study of the many audiences of many ages who use and enjoy museums.

312 **Internship in Museum Education** (6) Hoth

Full-time placement in education departments in area museums. Supervision and seminar are provided by George Washington University faculty. Limited to students in the museum education program.

316 **Curriculum Developments in Elementary School Social Studies** (3 to 6) Moore

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school social studies curriculum. Admission by permission of instructor.

317 **Curriculum Developments in Elementary School Science** (3 to 6) St. Cyr

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school science curriculum. Admission by permission of instructor.

320 **Curriculum Developments in Elementary School Mathematics** (3 to 6) St. Cyr

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school mathematics curriculum. Admission by permission of instructor. (Spring)

321 **Practicum in Curriculum** (3 to 6) St. Cyr

Supervised field experience in curriculum. Admission by permission of instructor. (Fall and spring)

322 **Internship: Reading** (3 to 6) Staff

Limited to doctoral students in Education. Experience in a selected area of college teaching. (Fall and spring)

323 **Internship: Reading** (3 to 6) Staff

Limited to doctoral students in Education. Service in a school situation directed by the University and school system to integrate theory and practice. (Fall and spring)

330 **Foundations of Early Childhood Education** (3) McIntyre

Historical developments, philosophy and objectives of nursery schools, kindergartens and day care centers, exploration of contemporary programs and models with curriculum implications. (Fall)

332 **Early Childhood Curriculum** (3) McIntyre

Content, approaches, methods, and materials in language arts, mathematics, science, health, social studies, and creative arts. (Fall)

333 **Role of the Professional in Early Childhood Education** (3) McIntyre

Planning, reporting, records, teacher-child and teacher-family interaction, diagnosis and evaluations, working with paraprofessionals. (Spring)

334 **Community Resources and Materials for the Young Child** (3) McIntyre

Interaction with community for services and resources; physical facilities including play activities and curriculum materials for the young child. (Spring)

335 **Practicum in Early Childhood Education** (3 to 6) McIntyre

Supervised professional activity in selected early childhood programs; seminar. Prerequisite: 12 semester hours in early childhood education and permission of instructor. (Fall and spring)

336 **Practicum in Reading** (3) Coleman, Peterson, and Staff

Supervised experience in testing and teaching in the Reading Center. Approximately 120 class hours required. Laboratory fee, $10. Admission by permission of instructor. (Fall and spring)

341 **Cognitive Models and Instruction** (3) Rashid

Cognitive models (Guilford, Piaget, etc.) are analyzed as the theoretical basis for planning instructional episodes appropriate at various levels—childhood through adulthood. (Fall)

342 **Language Development** (3) Rashid

Nature of language development; role of language in the socialization process. (Spring)

354 **Counseling of Minority Groups** (3) Vontress

Consideration of problems and approaches related to counseling cultural and racial minorities in American society; emphasis on counseling the disadvantaged in urban areas.

355 **Counseling in Groups** (3) Heddesheimer, Reeder

Principles of group dynamics as related to interaction within groups. Techniques and practice in group counseling. (Fall)

356 **Seminar: Guidance and the Disciplines** (3) Staff

For experienced counselors. Exploring the foundations of guidance through the disciplines of psychology, sociology, economics, anthropology, and philosophy.

357 **Personal and Social Adjustment** (3) Winkler

(Formerly Mental Hygiene)

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. (Fall and spring)

361 **Medical Aspects of Rehabilitation Counseling** (3) Sinick

Etiology, symptomatology, and treatment of chronic and traumatic disorders with rehabilitation counseling implications. Admission by permission of instructor. (Fall)

362 **Client Evaluation in Rehabilitation Counseling** (3) Sinick

Test and nontest methods of furthering client and counselor understanding. Prerequisite: Psyc 131. (Spring)

363 **Psychosocial Aspects of Rehabilitation Counseling** (3) Linkowski

Impact of congenital and later disabilities on attitudes, self concepts, and motivations. Implications for rehabilitation counseling. Admission by permission of instructor. (Fall)

364 **Middle-management in Rehabilitation** (3) Kuhagen

Technical and interpersonal aspects of supervisory and other management responsibilities related to professional and support personnel. Theory and practice in case management and staff development. Cast study and role playing.

365–66 **Field Work in Rehabilitation Counseling** (3–3) Kuhagen, Reeder

Field work of one full day a week. Educ 365: concurrent seminar including history, philosophy, and introduction to practice. Educ 366: concurrent seminar including job analysis, placement, and follow-up. Admission by permission of instructor. (Academic year)

367–68 **Internship: Rehabilitation Counseling** (6–6) Kuhagen, Reeder

Supervised practice of three full days a week, with seminar providing integration of theory and practice. Prerequisite: Educ 365–66. (Academic year)

369 **Professional Issues in Rehabilitation Counseling** (3) Staff

Culminating seminar covering professional problems and ethical issues. Prerequisite: Educ 367. (Spring)

370 **College Students and Their Community** (3) Speck

Survey of literature on the characteristics, behavior, and attitudes of the contemporary college student; college student interaction with his environment. Admission by permission of instructor. (Fall)

371 **Principles and Practices in College Teaching** (3) Greensberg

(Formerly Introduction to College Teaching)

General principles, methods, techniques, and experimental instructional media for teaching at the college and university level. (Fall)

372 **Internship in College Teaching** (3 to 6) Greenberg

Supervised experience in a selected area of college teaching. Prerequisite: Educ 371. Admission by permission of instructor. (Spring)

373 **The Community-Junior College** (3) Gleazer

The two-year college as it relates to secondary education, four-year colleges, and universities. Objectives, curricula, students, faculty, legal concerns, and special problems of two-year colleges. (Fall)

374 **Current Issues in Higher Education** (3) Elliott, Marinaccio

Prerequisite: Educ 283, 284. (Spring)

375 **Foundations of a College Student Development Program** (3) Kirkbride

College student development as an integral part of higher education programs. (Fall)

376 **College Student Development and Campus Groups** (3) Kirkbride

Principles and procedures of student development programs with campus groups; campus group activities and development of student leadership. (Spring)

377 **Practicum in College Student Development** (3 to 6) Kirkbride, Phelps

Supervised practical experience in college student development programs. Admission by permission of instructor. (Fall and spring)

378 **Practicum in Teacher Education** (3 to 6) Brenner, Boswell

For selected experienced teachers. Supervised field work relevant to student's professional needs, to be arranged. (Fall and spring)

379 **Practicum in Adult Learning Programs** (3 to 6) Nadler

Supervised practical experience in various forms of adult education and human resource development. Admission by permission of instructor. (Fall and spring)

380 **Sensitivity Training: Laboratory Method** (3) Drexler

A sensitivity learning experience in human relations using unstructured group experience, individual feedback, experimentation, and practice. Admission by permission of Department, prior to registration. (Fall and spring)

381 **Adult Learning** (3) Wigg

Learning theories as applied to adults in individual and group learning transactions; effect of age on learning; psychological, physical, and social environment in adult education situations. (Fall and spring)

382 **Methods and Techniques of Adult Learning** (3) Nadler

Methods, techniques, and devices for adult learning; developing action-oriented learning situations in adult learning programs. (Spring)

383 **Counseling of Adults** (3) Wigg

Theories and practical application of personal counseling, emphasizing distinct needs of adults and young adults in occupational settings; for supervisors, instructors, and counselors in military, government, business and industry settings. (Fall)

384 **Evaluation of Adult Learning Programs** (3) Staff

Measurement and evaluation of adult learning programs in school and nonschool agencies—business, industry, government, voluntary organizations, and community.

385 **Collective Negotiations in Higher Education** (3) Rhodes

Theory, practice, problems, and issues in collective negotiations in higher education.

386 **Current Issues in Adult Learning Programs** (3) Wiggs

For M.A. in Ed. degree candidates. Current issues and trends in the fields of adult education and human resource development. Admission by permission of instructor. (Spring)

387 **Administration of Adult Learning Programs** (3) Staff

Program administration, staff recruitment and development, fiscal operations, facilities, and maintenance of effective community relations. (Spring)

388 **Case Studies in Higher Education Administration** (3) Marinaccio

Limited to advanced doctoral students in Education. Analysis of selected hypothetical cases related to essential administrative functions of colleges and universities. Admission by permission of instructor.

389 **Consultant-Client Relationships in Human Resource Development** (3) Nadler

Examination of the consulting process, consultant-client behaviors, and dilemmas using theory and field experience for individual and organizational development. Prerequisite: Educ 264, 280; or approval of instructor. (Fall)

390 **Legal Problems in Higher Education** (3) Frankie

Investigation of legal problems in higher education related to administration, students, faculty, and academic program. (Spring)

391 **College and University Curriculum** (3) Greenberg

Development, patterns, creative design, issues, problems, evaluation, and trends in the higher education curriculum. (Fall)

392 **Financing Higher Education** (3) Muirhead

Analysis of private, state, and federal revenue sources; student aid, program budgets, and financial methods and practices. (Fall)

393 **Practicum in Higher Education** (3 to 6) Staff

Supervised field experiences in higher education; reports and conferences. Admission by permission of instructor. (Fall)

394 **College and University Governance** (3) Marinaccio

Organizational and administrative structures, patterns, and relationships in higher education. Prerequisite: Educ 284. (Fall)

395 **Problems and Practices in Educational Administrative Organization** (3 to 6) Marinaccio

Application of principles and practices concerned with change and evaluation of educational administration.

396 **Internship: Higher Education Administration** (3 to 6) Marinaccio

Service in a higher education situation directed by the University and the cooperating institution to integrate theory and practice. (Fall and spring)

397 **Internship: Elementary Administration** (3 to 6) Carroll, Brenner
Service in a school situation directed by the University and school system to integrate theory and practice. (Fall and spring)

398 **Internship: Secondary Administration** (3 to 6) Staff
Service in a school situation directed by the University and school system to integrate theory and practice. (Fall and spring)

399 **Seminar: Applied Educational Administration** (3 to 6) Carroll
Application of the theories and principles of administration to the public schools. Student participation with guidance by recognized regional practitioners.

400 **Special Workshop in Education** (arr.)
Topics to be announced in *Schedule of Classes*. May be repeated for credit.

FOURTH GROUP

A Master's degree from an accredited institution is prerequisite to all fourth-group courses. All fourth-group seminars are open to doctoral candidates or other post-Master's degree students with approval of instructor. Study is individually planned on the basis of previous study and experience in the subject field to attain an advanced level of competence and meet identified professional needs or field requirements.

Each of the following courses is offered fall and spring. Each course may be repeated for credit.

401 **Seminar: History of Education** (arr.) Frankie

403 **Seminar: Philosophy of Education** (arr.) Darland

405 **Seminar: Human Growth and Development** (arr.) Rashid

411 **Seminar: Elementary Education** (arr.) Baker

413 **Seminar: Secondary Education** (arr.) Kulawiec

421 **Seminar: Adult Education** (arr.) Nadler

422 **Seminar: Higher Education Administration** (arr.) Marinaccio

423 **Seminar: Higher Education** (arr.) Marinaccio, Frankie

424 **Seminar: College Student Development** (arr.) Kirkbride

425 **Seminar: Teacher Education** (arr.) Boswell, Baker

427 **Seminar: Human Resource Development** (arr.) Nadler

429 **Seminar: Educational Personnel Administration** (arr.) Carroll

431 **Seminar: Administration** (arr.) Carroll

433 **Seminar: Supervision** (arr.) Tillman

434 **Seminar: Elementary Supervision** (arr.) Carroll

435 **Seminar: Elementary Administration** (arr.) Carroll

436 **Seminar: Secondary Supervision** (arr.) Staff

437 **Seminar: Secondary Administration** (arr.) Staff

441 **Seminar: Curriculum** (arr.) St. Cyr

443 **Seminar: Guidance and Counseling** (arr.) Staff

445 **Seminar: Research and Evaluation** (arr.) Paratore, Smith

446 **Seminar: Reading** (arr.) Staff

490 **Pre-dissertation Seminar** (3) Staff

Required of all Ed.D. degree candidates. Approval of the dissertation prospectus is necessary for successful completion of the seminar. Admission by permission of instructor.

491 **Dissertation Research** (arr.) Staff

Preparation of a research outline; research and writing of an approved doctoral dissertation under the direction of major adviser and dissertation committee. Prerequisite: Educ 490.

Education Policy—Graduate Study

COMMITTEE ON EDUCATION POLICY

C.J. Lange (*Chairman*), S.K. Bailey, A.D. Kirsch, H.L. LeBlanc, Patricia Engermann, Martha Rashid, C.T. Stewart, Jr.

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degree of Doctor of Philosophy in the field of Education Policy. The program is directed by a committee whose members are drawn from the School of Education and from the Departments of Economics, Political Science, Psychology, Sociology, and Statistics.

The scope of the program is policy research and analysis as it relates to education, broadly conceived. It is intended for those who wish to pursue or continue academic careers or careers in policy-making positions.

Required: the general requirements, pages 93–97, 100–102. Candidates must complete four fields of study, one of which must be Education Policy Analysis. Each candidate is to develop a concentration within one academic discipline.

201–2 **Seminar: Current Issues in Education Policy** (3–3) Lange

Review of literature relating to current education policy issues with emphasis on use of research and analysis in formulating and evaluating policy.

222 **Seminar: Topics in Education Policy** (3) Staff
Intensive investigation of special topics in education policy.

290 **Advanced Studies in Education Policy** (3) Staff
Supervised study and field work in selected policy areas.

English

Professors C.D. Linton, R.H. Moore, P.H. Highfill, Jr., J.G. Allee, Jr., J.P. Reesing, Jr., Milton Crane, E.R. Weismiller, R.N. Ganz, Jr., G.E. McCandlish (*Chairman*)
Adjunct Professor J.C. Broderick
Associate Professors W.L. Turner, Muriel McClanahan, A.E. Claeyssens, Jr., R.C. Rutledge, J.A. Quitslund, Judith Plotz, J.H. Maddox
Assistant Professors C.W. Sten, G.R. Bozzini, Agnes Cannon, R.L. Combs, Geoffrey Carter
Assistant Professorial Lecturers Margaret Grotte, Laurel Rule
Instructors Ann Romines, David McAleavey, Gail Paster, Cynthia Walker
Lecturers Elna Broffman, Betsy Sterman, Victoria Arana-Robinson, Janet Carroll, Hazel Eagle, Charles Heise, Deborah Nason, Margaret Strom, Jean Wukovich

Bachelor of Arts with a major in American Literature or *English Literature* (*Field-of-Study or Departmental*).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirements for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)

2. **Prerequisite courses—Engl 51–52 or 71–72 or 91–92.**

3. Required courses in related areas—(a) 12 semester hours of a foreign language (Classical Hebrew, Greek, Latin, French, German, Italian, Russian, or Spanish), or equivalent; (b) 6 semester hours of Philosophy and/or Religion; (c) 6 semester hours of History (English, American, European, or World).

4. **Required for the major:**

(a) *Field-of-Study major*—the passing of the major examination in either American or English Literature at the end of the senior year. No set pattern of courses is prescribed. The student is expected to engage himself more or less systematically with writers and works from the whole chronological span of American literature or English literature. The field-of-study major offers an opportunity during the student's senior year for work in special seminars, and, for honors candidates, independent study. A Proseminar in American Literature, Engl 199–200, and a Senior Seminar in English Literature, Engl 159 and/or 160, assist students in their preparation for the major examination. *Students who wish to be candidates for graduation with Special Honors in either American or English Literature must be in the field-of-study major.*

(b) *Departmental major*—30 semester hours of second-group courses offering experience with several approaches to literature which, together, make a discipline of literary study—practical criticism, history of literature, literary period(s), genre(s), and major author(s)—distributed as follows:

American Literature majors—24 semester hours of American Literature courses, including Engl 161–62; 6 hours of English Literature courses.

English Literature majors—15 semester hours of English Literature courses, including Engl 121, 122, a 3-hour course on a literary period, a 3-hour course on a genre, and a 3-hour course on a major author; 3 semester hours of American Literature; and 12 additional hours of courses offered by the Department of English of which at least 9 hours must be in English Literature.

Master of Arts in the field of American Literature.—Prerequisite: the degree of Bachelor of Arts with an undergraduate major in English, or 24 semester hours in English and/or American literature above the sophomore level.

Required: the general requirements, pages 93–100, including (1) 24 semester hours of course work planned in consultation with the adviser on the basis of the student's undergraduate preparation, including a minimum of 6 semester hours in English literature; (2) a written Master's Comprehensive Examination; (3) a Master's thesis (6 semester hours) written on an approved topic under the direction of the instructor in whose field the major portion of the material falls, or, with the approval of the Department adviser, 12 additional semester hours in lieu of thesis.

Master of Arts in the field of English Literature.—Prerequisite: the degree of Bachelor of Arts with an undergraduate major in English or American Literature, or 24 semester hours in English and/or American literature above the sophomore level.

Required: the general requirements, pages 93–100, including (1) 24 semester hours of course work, planned in consultation with the adviser; (2) a written Master's Comprehensive Examination; and (3) a Master's thesis (6 semester hours) written on an approved topic under the direction of the instructor in whose field the material falls, or, with the approval of the Department adviser, 12 additional semester hours in lieu of thesis.

Doctor of Philosophy in the field of American Literature.—Required: the general requirements, pages 93–97, 100–102; *high-level* proficiency in an appropriate foreign language; the passing of a General Examination in four of the six following fields, one of which must be English Literature: (1) Early American Literature—to 1815, (2) American Fiction, (3) American Poetry, (4) American Romanticism, (5) American Realism, (6) English Literature—one of the first seven fields listed below under "Doctor of Philosophy in the field of English Literature." Each student plans his program in consultation with a departmental committee.

Doctor of Philosophy in the field of English Literature.—Required: the general requirements, pages 93–97, 100–102; *high-level* proficiency in an appropriate foreign language; the passing of a General Examination in four of the eight following fields: (1) Beginnings to 1500, Linguistics, and History of the Language; (2) 1500–1660; (3) 1660–1800; (4) 1800–1900; (5) 1900 to Present; (6) Drama, including Shakespeare; (7) Criticism; (8) American Literature—one of the first five fields listed above under "Doctor of Philosophy in the field of American Literature." Each student plans his program in consultation with a departmental committee.

Bachelor of Arts in Education with a a teaching field in English.—Prerequisite: the Education curriculum, page 79.

Required: the English option and the professional courses listed on pages 114, 120–21.

Students whose College Board English Composition Achievement Test scores suggest inadequate preparation may be assigned to Engl 9 or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill, before placement in either Engl 9 or 10. Students whose scores and/or writing skill indicate superior competence will be allowed to waive Engl 10; those whose scores indicate markedly superior competence will be allowed to waive both Engl 10 and Engl 11 or 12.

The admission of international students to any English course is determined by the

English Placement Test for Foreign Students. Students should apply to undergraduate admissions to take this test (see pages 26–27).

Departmental prerequisite: Engl 9 or 10 is prerequisite to all other courses in English. A 6-semester-hour course in literature, or equivalent, or written permission of the instructor, is prerequisite for admission to all second-group courses in English except Engl 115 and 161–62.

ENGLISH COMPOSITION

FIRST GROUP

2 English for International Students (5) — Bozzini

Intermediate grammar, reading, and vocabulary review course for international students not yet ready for Engl. 3. Course meets 10 class hours and 3 monitored laboratory hours a week. Further laboratory work encouraged. (Fall and spring)

3 English for International Students (3) — Bozzini and Staff

Advanced grammar, reading, and vocabulary review course for international students not yet ready for extended writing practice. Meets 3 hours a week.

4 Conversational English for International Students (5) — Bozzini

Intermediate level course centered on developing conversational fluency through use of dialogue, idiom drills, and contextually oriented topics (newspapers, banking, entertainment, etc.) Meets 10 hours a week. (Fall and spring)

5 English for International Students (3) — Bozzini and Staff

Composition course providing extended writing practice for international students showing a high degree of proficiency in use of English. Development of writing skills; study of exposition techniques; library research. 5 hours a week. Students completing Engl 5 with grade of *A* or *B* will receive academic credit for the course and may enroll in Engl 11 or 12 to fulfill the Columbian College undergraduate requirement in English. Total fee, $320.05 (Tuition $282; additional fee, $25; University Center fee, $13.05). (Fall and spring)

9 English Composition: Language as Communication (3) — Moore and Staff

Intensive course in English grammar and composition for students inadequately prepared for Engl 10. Begins with detailed instruction, drill, and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 10. Engl 9 meets five hours a week and carries 3 semester hours of credit. Total fee, $320.05 (tuition, $282; additional fee, $25; and University Center Fee, $13.05). (Fall and spring)

10 **English Composition: Language as Communication** (3) — Moore and Staff

Study and practice of expository techniques; emphasis on the rhetorical complexities of unity, development, organization, and coherence, by analysis of selected current prose; library research procedure. (Fall and spring)

11 **English Composition: Language and the Arts and Sciences** (3) — Moore and Staff

Study and practice of expository and argumentative techniques; emphasis on the rhetorical complexities of the sentence and of diction, and on logical thought, by analysis of selected readings on the nature of language and of the arts and sciences. Prerequisite: Engl 9 or 10. Students who receive credit for Engl 11 cannot receive credit for Engl 12. (Fall and spring)

12 **English Composition: Language in Literature** (3) — Moore and Staff

Study and practice of expository and argumentative techniques through critical writing; emphasis on the rhetorical complexities of stylistics in the sentence and in diction, and on logical thought, by the study of literary genres and of the use of language in literature. Prerequisite: Engl 9 or 10. Students who receive credit for Engl 12 cannot receive credit for Engl 11. (Fall and spring)

SECOND GROUP

101 **Expository Writing** (3) — McClanahan, Moore

Types of expository writing; weekly exercises based on students' needs; particular attention may be given to problems in the writing of graduate theses. Prerequisite: Engl 9 or 10; 11 or 12. (Fall and spring)

102 **Narrative Writing** (3) — McAleavey

Techniques of narrative writing; class criticism of student writing. Prerequisite: Engl 9 or 10; 11 or 12; consent of instructor. To apply for the instructor's consent a student should, before registration, submit samples of his writing. (Fall and spring)

103 **The Writing of Fiction—the Short Story** (3) — Weismiller

Prerequisite: Engl 102, consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing. (Fall)

105–6 **The Writing of Plays** (3–3) — Claeyssens

Prerequisite: Engl 9 or 10; 11 or 12; consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing. (Academic year)

107 **The Writing of Fiction—the Novel** (3) — Claeyssens

Prerequisite: Engl 102 or 103; consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing.

108 **Advanced Writing—Poetry and Prose** (3) — Weismiller

Prerequisite: Engl 9 or 10; 11 or 12; consent of instructor. To apply for

the instructor's consent a student should, before registration, submit a sample of his writing. (Spring)

ENGLISH LITERATURE

FIRST GROUP

51–52 **Introduction to English Literature** (3–3) Quitslund and Staff

Representative works by major authors studied in their historical context; discussion of recurrent themes, and introduction to various types and forms of imaginative literature. (Academic year)

91–92 **Introduction to European Literature** (3–3) Reesing and Staff

Selected major works in various genres, read in translation and in entirety. Engl 91: *Iliad* and *Aeneid;* dramas from ancient to modern times. Engl 92: Thucydides, Plato, Ovid, and Dante; medieval saga and romance; prose fiction from Cervantes to Mann. (Academic year)

SECOND GROUP

111 **Medieval English Literature—Exclusive of Chaucer** (3) Allee

112 **Chaucer** (3) Allee

115 **Introduction to English Linguistics** (3) Allee

Development of the English language in a historical treatment of English grammar. (Fall)

116 **Medieval Legend and Saga** (3) Allee

Celtic and Norse.

117–18 **English Poetry: Form and Content** (3–3) Weismiller

Study of poetry in English, both traditional and modern; emphasis on the ordering of language by which poetry brings into being patterns of thought and feeling which release meaning. (Academic year)

121 **Practical Criticism** (3) Plotz

Consideration of various uses of language and complex shapes of thought in literature; introduction to mature study and full enjoyment of poetry, fiction, and drama. (Fall)

122 **History of English Literature** (3) Reesing

(Spring)

123 **Principles of Literary Criticism** (3) Plotz

Studies in works of major critics with a view to clarifying the ways in which works of art are analyzed, described, classified, judged, and justified: Aristotle, Longinus, Dryden, Johnson, Coleridge, Schiller, Arnold, Eliot, Richards, Frye. (Spring)

125–26 **Elizabethan Verse and Prose** (3–3) Quitslund

Engl 125: major authors of lyric poetry, prose fiction, and criticism of the

later 16th century. Engl 126: the poetry of Edmund Spenser in the context of other Renaissance poetry.

127–28 **Shakespeare** (3–3) Highfill, Quitslund
Development of dramatic forms and recurrent themes. Engl 127: histories and comedies. Engl 128: tragedies. (Academic year)

129 **The Earlier 17th Century** (3) Reesing
Poetry and prose to 1660, exclusive of Milton.

130 **Milton** (3) Reesing

131–32 **English Literature, 1660–1780** (3–3) Highfill
Poetry and prose of the Neoclassic period. Engl 131: 1660–1740. Engl 132: 1740–1780. (Engl 132: Spring)

133–34 **The Romantic Movement** (3–3) Plotz
Engl 133: survey of poetry and prose, 1780–1830. Engl 134: detailed study of major writers and genres.

135–36 **Victorian Literature** (3–3) Carter
Engl 135: survey of poetry and prose, 1830–1900. Engl 136: detailed study of major writers and genres. (Academic year)

137–38 **The 20th Century** (3–3) Linton
Literature since 1900. Engl 137: poetry and criticism. Engl 138: drama and the novel. (Academic year)

145–46 **Special Topics in English Literature** (3–3) Weismiller
Engl 145: poetry in English since World War II. Engl 146: the English epic. (Academic year)

151 **19th Century British Poetry** (3) Staff
Readings in Wordsworth, Keats, Browning, and Swinburne.

153–54 **The English Novel** (3–3) Maddox
Major novelists. Engl 153: 18th century. Engl 154: 19th century. (Academic year)

155–56 **The English Drama** (3–3) Crane
Engl 155: principally the drama of Shakespeare's contemporaries. Engl 156: historical survey, 1660 to present. (Academic year)

157 **20th Century Drama** (3)
Representative continental, English, and American plays of the 20th century.

158 **20th Century British Prose Fiction** (3)

159–60 **Senior Seminar in English Literature** (3–3) Quitslund
Engl 159: irony as a literary technique or mode and as a critical term from Chaucer to the 20th century. (Engl 159—fall)

197 **Independent Study** (3) — Reesing and Staff

Open to honors candidates in the field-of-study major during their senior year. (Fall and spring)

198 **Senior Honors Thesis** (3) — Weismiller and Staff

An independent-study course in which, under the guidance of an instructor, the student writes a thesis on an approved topic. Open to qualified seniors in the field-of-study major in English Literature. (Fall and spring)

THIRD GROUP

212 **Studies in Chaucer** (3) — Allee

(Spring)

213 **Old English** (3) — Allee

Old English grammar and readings.

214 **Beowulf** (3) — Allee

Prerequisite: Engl 213 or equivalent.

217 **English Poetry: the Formal Development** (3) — Weismiller

218 **Form and Content in Modern Poetry** (3) — Weismiller

219 **Research Methods and Bibliographical Materials** (3) — Broderick

To acquaint graduate students with the principal sources of bibliography and the typical problems in research. (Fall)

220 **Studies in Modern Dramatic Literature** (3) — Crane

221 **Studies in Comic Literature** (3) — Crane

223–24 **Studies in Literary Criticism** (3–3) — Plotz

225–26 **Studies in 16th Century English Literature** (3–3) — Quitslund

227–28 **Studies in Shakespeare and His Contemporaries** (3–3) — Crane

(Academic year)

229 **Studies in English Literature, 1600–1660** (3) — Reesing

Chief figures exclusive of Milton. (Fall)

230 **Studies in Milton** (3) — Reesing

(Spring)

231–32 **Studies in English Literature, 1660–1780** (3–3) — Highfill

(Engl 231—fall)

233–34 **Studies in the Romantic Movement** (3–3) — Plotz

(Academic year)

235–36 **Studies in Victorian Literature** (3–3) — Carter

237–38 **Studies in 20th Century Literature** (3–3) Linton

253–54 **Seminar: the English Novel** (3–3) Maddox

255–56 **Studies in Dramatic and Theatrical History** (3–3) Highfill

Engl 256: seminar in drama and theatre of the Restoration and 18th Century, held among the Folger Library collections. A Folger Institute Seminar. (Spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

George Washington University is a member of the Folger Institute of Renaissance and 18th-century Studies. The policies of the Institute are set by a central committee on which each member institution is represented. Doctoral students enrolled in one of the Institute seminars are eligible to apply for fellowship aid, under a grant from the National Endowment for the Humanities. Folger Institute Seminars are numbered 301 through 309. Students wishing to register for these courses should consult the Chairman of the Department of English.

301 **Origins of the Scientific Revolution** (3) Staff

(Fall)

302 **Restoration and 18th-Century Drama** (3) Highfill and Staff

(Spring)

305 **English Renaissance Palaeography** (3) Staff

(Fall)

304 **The Revolution of 1689** (3) Schwoerer

(Spring)

306 **Shakespeare and the Scholarly Tradition** (3) Staff

(Spring)

307 **Petrarchism and Stoicism in the Renaissance** (3) Staff

(Fall)

308 **Milton in the Context of 17th-Century English Politics** (3) Staff

(Spring)

309 **Dante: A Reading of The Divine Comedy** (3) Staff

(Fall)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

AMERICAN LITERATURE

FIRST GROUP

71–72 **Introduction to American Literature** (3–3) McClanahan and Staff
Historical survey. Engl 71: from beginnings to the Civil War. Engl 72: from the Civil War to present. (Academic year)

SECOND GROUP

161–62 **Studies in American Literature** (3–3) Sten
Same as AmCv 161–62. Major factors in the national cultural tradition as shown by outstanding writers. (Academic year)

163–64 **Major American Poets** (3–3) Ganz
Advanced critical study of significant writers and movements. Engl 163: from beginnings through the 19th century. Engl 164: the 20th century. (Academic year)

165–66 **American Drama** (3–3) Claeyssens and Staff
Historical and critical study of significant plays and forms. Engl 165: from beginnings to 1930. Engl 166: since 1930. (Academic year)

167–68 **The American Novel** (3–3) Maddox
Historical and critical study of significant novels. Engl 167: from beginings through the 19th century. Engl 168: 20th century. (Academic year)

170 **The American Short Story** (3) Claeyssens
Historical development of the short story in America. (Fall)

171–72 **Major American Writers** (3–3) Cannon
Engl 172: Melville, Faulkner, Bellow. (Spring)

173–74 **Selected Literary Movements** (3–3) Staff

175–76 **Special Topics in American Literature** (3–3) Combs, Sten
Engl 175: the sexes in conflict and conspiracy—a perspective on the romantic tradition in 20th century American literature. Engl 176: "The Twenties"—literary and cultural developments in the post-World War I decade: Dos Passos, Hemingway, Fitzgerald, Eliot, Stein, Wolfe, Lewis, Parker, Hart Crane, cummings, Pound, Veblen. (Academic year)

177–78 **Contemporary American Literature** (3–3) Ganz, Claeyssens
Major and representative works since World War II. (Academic year)

197 **Independent Study** (3) Reesing and Staff
Open to honors candidates in the field-of-study major during their senior year. (Fall and spring)

198 **Senior Honors Thesis** (3) Weismiller and Staff

An independent-study course in which, under the guidance of an instructor, the student writes a thesis on an approved topic. Open to qualified seniors in the field-of-study major in American Literature. (Fall and spring)

199–200 **Proseminar in American Literature** (3–3) Sten. Combs

For field-of-study majors in American Literature. Readings, conferences, and group discussions. (Academic year)

THIRD GROUP

219 **Research Methods and Bibliographical Materials** (3) Broderick

To acquaint graduate students with the principal sources of bibliography and the typical problems in research. (Fall)

263–64 **Studies in American Poetry** (3–3) Ganz

(Academic year)

267–68 **Seminar: American Fiction** (3–3) Maddox

Research and critical reading: fiction and the criticism of fiction. (Academic year)

270 **Seminar: the American Short Story** (3)

281–82 **Seminar: Early American Literature** (3–3) McCandlish

Same as AmCv 281–82. (Academic year)

283–84 **Studies in American Romanticism** (3–3) Broderick

Engl 283: Melville—the early fiction. (Engl 283—spring)

285–86 **Seminar: American Literature, 1865–1900** (3–3) McCandlish

Realism in America.

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

367–68 **Readings in American Fiction** (3–3) Maddox

For graduate students only. Literature and the critical materials for which graduate students are responsible on the Doctor of Philosophy general examination.

381–82 **Readings in Early American Literature** (3–3) McCandlish

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Environmental Studies

COMMITTEE ON ENVIRONMENTAL STUDIES

Henry Merchant (*Chairman*), Otto Bergmann, S.W. Burks, R.S. French, I.I Glick, R.W. Kenny, R.C. Lindholm, W.E. Schmidt

Columbian College of Arts and Sciences offers interdepartmental programs in Environmental Studies leading to the degree of Bachelor of Arts or Bachelor of Science. The program leading to the degree of Bachelor of Arts is designed for the student whose orientation is essentially political or social and who expects to enter law, politics, urban planning, or other areas for the purpose of altering society's responses to environmental problems. The program leading to the degree of Bachelor of Science is designed for the student with well developed interests in science who seeks professional identification as a field or laboratory worker in the environmental sciences.

Bachelor of Arts with a major in Environmental Studies (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses (qualified students may substitute advanced courses with departmental permission, in order to include more elective courses in their program):
   (a) Mathematics and/or Statistics—9 semester hours selected from Math 31, 32, 51, 52, 111; Stat 91, 97, 113, 118, 198.
   (b) Natural Sciences—6 to 8 semester hours selected from BiSc 11–12; Chem 11–12; Geol 1–2; or Phys 1, 2.
   (c) Social Studies—12 semester hours selected from Anth 1–2; Econ 1–2; Geog 51, 52; PSc 4 or 5, 6; Psyc 1, 5–6; or Soc 1, 2.
3. Required courses in the major (48 semester hours):
   (a) BiSc 140 (4 semester hours).
   (b) 8 semester hours selected from BiSc 111, 115, 118, 123, 124, 167 (Biology); BiSc 109, 110 (Botany); BiSc 101, 102, 143, 144 (Zoology); Chem 50, 151–52, 156; Geol 5, 125, 141, 163, 172, 181; Phys 6, 31, 32.
   (c) 30 semester hours in courses selected from *two* departments in the following—Anth 151, 152, 170; Econ 101, 102, 136, 157; Geog 127, 132, 135, 140, 142, 144; PSc 103, 104, 108, 146; Psyc 151, 156; Soc 126, 127, 128.
   (d) Envr 151–52 (6 semester hours).

Bachelor of Science with a major in Environmental Studies (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses (qualified students may substitute advanced courses with departmental permission, in order to include more elective courses in their program):
   (a) Mathematics and/or Statistics—9 semester hours selected from Math 31, 32, 51, 52, 111; Stat 91, 97, 113, 118, 198.
   (b) Natural Sciences—12 to 16 semester hours selected from BiSc 11–12; Chem 11–12; Geol 21–22; Phys 1, 2. Either BiSc 11–12 or Chem 11–12 must be selected.
   (c) Social Studies—12 semester hours selected from Anth 1–2; Econ 1–2; Geog 51, 52; PSc 4 or 5, 6; Psyc 1, 5–6; Soc 1, 2.
3. Required courses for the major (48 semester hours):
   (a) BiSc 140 (4 semester hours).
   (b) 20 semester hours selected from BiSc 111, 115, 118, 123, 124, 167 (Biology); BiSc 109, 110, 125 (Botany); BiSc 101, 102, 143, 144 (Zoology); Chem 50, 151–52, 153–54; Geol 5, 125, 141, 163, 172, 181; Phys 6, 31, 32.

(c) 18 semester hours selected from Anth 151, 152, 170; Econ 101, 102, 136, 157; Geog 127, 132, 135, 140, 142, 144; PSc 103, 104, 108, 146; Psyc 151, 156; Soc 126, 127, 128.

(d) Envr 151–52 (6 semester hours).

The science and social studies courses listed under 3(b) and 3(c) above must be taken in not more than *three* departments.

In choosing elective courses for both the Bachelor of Arts and Bachelor of Science degree programs, students are reminded that permission of the Dean of Columbian College of Arts and Sciences and the Committee on Environmental Studies is necessary to take courses not offered by Columbian College of Arts and Sciences, and that a maximum of 12 semester hours of such courses may be taken. The following may be of interest to the Environmental Studies major: BAd 101, 171, 172, 173, 174, 201, 203; *CE 194, 197; HKLS 152; U&RP 153, 201, 205. The permission of the instructor, the department chairman, and the Dean of the School of Government and Business Administration is necessary to take graduate courses (numbered 201 and above) in that School.

SECOND GROUP

151–52 **Senior Seminar in Environmental Studies** (3–3) Staff

Limited to majors in Environmental Studies. Directed reading and discussion of contemporary environmental problems.

Experimental Humanities†

Professor C.C. Mondale
Associate Professor R.S. French
Lecturer G.H. Williams

EXPERIMENTAL HUMANITIES

FIRST GROUP

4 **Politics and Values** (3) Staff

(Formerly Contemporary Political Imagination)

A freshman course; limited enrollment. Students will be housed in Thurston Hall. Field-study and case-study of value conflicts implicit in selected political issues involving federal policy and legislation. Concurrent registration in a special section of PSc 4 required. Students registering for Hum 4 in the fall semester will be required to register for Hum 6 in the spring semester. Admission by permission of instructor. (Fall)

* See the *School of Engineering and Applied Science* catalogue for Civil Engineering courses.
† Administered by the Division of Experimental Programs.

6 **Contemporary Political Imagination** (3)

Continuation of Hum 4. Concurent registration in a special section of PSc 6 required. Prerequisite: Hum 4. (Spring)

*26 **Environmental Issues** (3) French, Langran, Schiff

An interdisciplinary analysis of selected aspects of the population question, pollution and human health, urban environmental problems, issues of economic growth and development, technology and public policy. (Fall and spring)

37 **Computer Technology and Social Issues: the Search for New Alternatives** (3) Staff

An all-university course designed primarily for freshmen. Student team-study of selected social issues related to developing computer technology. Introduction to computer systems and to applications and long-range implications of the new technology. (Fall)

40 **Washington, D.C., Culture and Politics** (3) French and Interdisciplinary Team

An all-university course designed primarily for freshmen and transfer students. Major facets of metropolitan life, past and present, analyzed by faculty, students, and community leaders. (Fall)

42 **The United States and Japan** (3) Halpern

Interdisciplinary and issue-oriented examination of the cultural and political consequences to Americans of the emergence of Japan as a postwar power. Special effort is made to incorporate field resources in the Washington, D.C. area for class presentations and student research. (Fall)

51–52 **The Individual and the City** (3–3) Mondale

Sophomore-level course. Hum 51: impact of urbanization on individuality as revealed in the arts and literature, and as analyzed in scientific studies of culture and personality. Hum 52: individual and/or group study of agencies of change, with special reference to Washington, D.C., area. Admission by permission of instructor. (Academic year)

SECOND GROUP

101–2 **Supervised Field-Study** (6–6) French

Community-based projects supervised by appropriate faculty. Juniors and seniors admitted by permission of instructor. Prerequisite to Hum 102: Hum 101. (Hum 101 and 102—fall and spring)

160 **Aesthetics of Cinema** (3) Claeyssens, Pfuntner

Better "seeing," rather than an accumulation of knowledge about the history of cinema. Development of disciplined, informed viewing of cinema, comparable to the cultivated reading of novels and poetry.

162 **The Renaissance Man and the Ideal City** (3) J. Quitslund

The ideal of the "universal man" and the corresponding social ideal of beauty, harmony, and practicality in urban life, approached through the

* Offered jointly by the Division of Experimental Programs and the departments of Biological Science and Geography and Regional Science.

study of representative Renaissance figures and 20th century architects. (Spring)

171–72 **The Legal Process** (3–3) Nash,* Williams†

The function which law plays in society and the nature of the legal process. Examination of the societal assumptions and values that mold the law. Emphasis upon institutions that make up the law—the courts, administrative agencies, legislative bodies, and executive agencies. Open only to juniors and seniors by permission of instructor. (Academic year)

174 **Science and Values** (3) Schmidt, Parke

Study of the effects of scientific knowledge and technology on social institutions and the image of man, of the question of ethic and morality in science, and of the science of values. Admission by permission of instructor. (Spring)

‡188 **Attitudes toward Death and Dying** (3)

Exploration of the many different aspects, attitudes, and experiences associated with the process of death and dying. Limited to juniors and seniors.

198 **Conference on Policy Studies and the Humanities** (3 or 6) Mondale and Interdisciplinary Team

Examination of specific contemporary policy issues in relation to alternative social goals. A new policy issue will be selected each year. Open only to graduate, law, and medical students, and upper-level undergraduates by permission of instructor. (Spring)

SERVICE–LEARNING EXPERIMENTAL HUMANITIES

SECOND GROUP

151 **Urban Legal Services** (5) Williams†

Fieldwork and academic study of the urban legal system. Role of the urban legal system in promoting humanistic values and enhancing social change. Admission by permission of instructor. (Fall and spring)

152 **Human Resource Issues in Education** (6) Nashman

Exploration of the effects of education on society and vice versa; opportunities for experience, study, and service in public, private, museum, hospital, and community education centers. Admission by permission of instructor. (Fall and spring)

153 **Issues in American Health Care** (5) McCally

Field work combined with academic study of present American health care system and its problems: cost, quality of care, delivery of health care, ethical issues, health education, consumer issues, etc. Field-placements (12-20 hours a week) in appropriate health-related activities. Admission by permission of instructor. (Fall and spring)

* Ralph Clarke Nash, Jr. is Professor of Law in the University's National Law Center.
† Gregory Howard Williams is Lecturer in Law in the University's National Law Center.
‡ Offered jointly by the Division of Experimental Programs and the Department of Psychology.

154 **Independent Study** Mondale

Fieldwork combined with academic study, involving field-placements (12-20 hours a week) and complementary academic program of study, under the supervision of an appropriate faculty member. Students must "contract" with the agency, the faculty member, and the Service-Learning Program. Admission by permission of instructor. (Fall and spring)

155 **The Arts and their Audiences** (6) Garner

Studies in the purpose and operation of the arts organizations in Washington. Weekly seminars and placement in an internship in an arts organization. Discussion topics focus on the process of communication between artists and the public, the government, and the business community. Open to students with a demonstrated interest in the arts and the maturity to perform in a responsible position in an arts organization. (Fall and spring)

Forensic Sciences

Professors T.P. Perros, A.H. Desmond, R.C. Allen (*Chairman*), J.E. Starrs, T.F. Courtless, Jr.
Professorial Lecturers A.H. Kaplan, K.M. Earle, I.W. Conrad, Briggs White, R.C. Froede, C.J. Stahl III, J.G. Zimmerly, D.A. Crown
Adjunct Professor C.G. McWright
Associate Professor E.S. Sirulnik (*Visiting*)
Associate Professorial Lecturers F.B. Johnson, I.M. Sopher, T.F. Kelleher, Jr., L.R. Goldbaum, H.M. Silverberg, R.W. Hertzog, R.L. Brunelle
Assistant Professorial Lecturers C.L. Killion, R.J. Golten, J.S. Johnson, K.E. Melson, I.G. Peniston, E.H. Williams

Master of Forensic Sciences.—Prerequisite: a Bachelor's or a graduate degree from an accredited institution of higher learning and academic or professional training in the behavioral, biological, or physical sciences; law; or medicine.

Required: the general requirements pages 93–100. The program of study consists of 36 semester hours of graduate-level courses, or, if a thesis is required, the program consists of 30 semester hours of graduate-level courses plus a thesis (equivalent to 6 semester hours). The program of study must include ForS 220 if the student does not have a background in the forensic physical sciences, and ForS 224 if the student has no prior academic training in law. In addition, the student is required to select the following course work: (1) at least 9 semester hours in the forensic physical sciences selected from ForS 201, 202, 203, or 204; (2) at least 6 hours in forensic medicine selected from ForS 214, 260, 261, 262, 263, 264, 266, 267, or 269; (3) at least 6 hours in law and the administration of justice selected from ForS 225, 227, 228, 229, 231, or 232; (4) the remaining semester hours must be selected in consultation with the adviser so that each program of study includes at least 21 hours selected from the forensic physical sciences, forensic medicine, the physical and natural sciences (including the basic medical sciences), and thesis research. Other course work must be selected from the behavioral sciences, management science, or forensic sciences. All candidates are required to pass a written Master's Comprehensive Examination. There is no tool requirement.

Master of Science in Forensic Science.—Prerequisite: a Bachelor's or a graduate egree from an accredited institution of higher learning and academic or profes-onal training in the biological or physical sciences.

Required: the general requirements pages 93–100. The program of study consists f 36 semester hours of graduate-level courses, or, if a thesis is required, the pro-am consists of 30 semester hours of graduate-level courses plus a thesis (equiva-nt to 6 semester hours). Individualized programs of study will be developed to eet the career objectives of each student. Each such program of study must include orS 224 if the student has no prior academic training in law, plus at least 6 semester ours in law and administration of justice selected from ForS 225, 227, 228, 229, 31, or 232. In addition, students will normally take at least 9 semester hours of boratory course work, plus an internship, or thesis research in their areas of special terest. The remaining semester hours must be selected from approved courses in e biological and physical sciences, forensic sciences, management science, law, or e basic medical sciences. All candidates are required to pass a written Master's omprehensive Examination. There is no tool requirement.

Master of Arts in Special Studies (Criminal Justice).—Prerequisite: a bachelor's or graduate degree from an accredited institution of higher learning.

Required: the general requirements, pages 93–100. The program of study consists f 36 semester hours of approved graduate-level courses drawing upon the forensic iences, law, criminology, management science, sociology, and psychology. A typical rogram of studies will include: ForS 214, 220, 224, 225, 228, 229, 231, and 232. harm 115 *(Drug Abuse Education);* Soc 263, *(Seminar: Law and Society),* and 271 ociology and the Youthful Offender); and Mgt 207 *(Human Behavior in Organiza-ons).* All candidates are required to pass a written Master's Comprehensive Exami-ation. There is no tool requirement.

The interdisciplinary programs leading to the degrees of Master of Forensic iences and Master of Science in Forensic Science may include course work from e School of Government and Business Administration, from the National Law enter, and from the behavioral, biological, and physical science departments of he Graduate School of Arts and Sciences. Students work closely with their advisers n setting up a program that meets their interests, needs, and background knowledge. The Department of Forensic Sciences is affiliated with the Armed Forces Institute f Pathology in a program of mutual exchange among students, courses, and facili-es. For further information, contact the Department of Forensic Sciences.

HIRD GROUP

201 **Serology, Microscopy, Mineralogy** (3) Desmond

Fundamental analysis of blood grouping tests and of those materials primarily identified using the microscope. Specific procedures and techniques utilized in forensic serology—from indicative color tests to blood enzyme classifications and microscopic analyses of hairs, fibers, and reproductive cells. Limitations of the expert in determining blood and human food grouping, and natural and synthetic fiber classification, with subsequent interpretations for courts. (Fall)

202 **Instrumental Analysis** (3) Perros

Principles and application of various instrumental methods to the examination of criminal evidence, including chromatographic and spectrophotometric techniques and mass spectrometry. (Spring)

203 **Examination of Questioned Documents** (3) Williams, Crown

Theory and principles of handwriting and handprinting, duplicating processes, paper manufacture and fiber analysis; studies of paper and methods of examination of questioned documents. (Fall)

204 **Firearms and Tool-mark Identification** (3) Brunelle

Study of methods for identifying firearms, cartridge casings, tool-marks, tire marks, and footprints. (Spring)

*214 **Forensic Psychiatry** (3) Allen, Silverberg

Introduction to the constructs of dynamic psychiatry, psychiatric treatment and the nomenclature of mental disorders. Consideration of expert testimony, direct examination and cross-examination in hospitalization and criminal cases. (Spring)

220 **The Crime Lab, the Forensic Scientist, and the Criminal Lawyer** (3) Starrs, Williams

Survey of the forensic physical sciences; qualifications and preparation of the expert witness, and his role in court in criminal and civil cases; operation and functioning of the crime lab. (Fall and spring)

224 **Introduction to Criminal Law, Procedure, Evidence, and Legal Methods** (3) Starrs, Golten, Allen

Principles of criminal law and procedure, preparation and presentation of evidence, examination of witnesses, and the methods of legal research. (Fall and spring)

225 **Advanced Criminal Evidence** (3) Starrs

Study of procedural rules affecting the collection and use of physical evidence, with emphasis on court opinions defining the rules of search and seizure and admissibility of evidence. Prerequisite: ForS 224 or equivalent experience. (Spring)

*227 **Advanced Criminal Procedure** (3) Starrs, Peniston

Decision to arrest, prosecutive discretion, bail, the preliminary hearing, right to a speedy trial, discovery, plea bargaining, publicity, post-conviction procedures. Prerequisite: ForS 224 or equivalent experience. (Fall)

*228 **Administration of Criminal Justice** (3) Allen, Sirulnik

Consideration and analysis of selected advanced problems in the administration of criminal justice. Emphasis on the role and professional responsibilities of prosecutor and defense counsel and on developmental trends in the law. Prerequisite: ForS 224 or equivalent experience. (Fall)

*229 **The Police and the Community** (3) Allen, Courtless

Problems and potential of contemporary urban law enforcement; the role and perspective of the police officer. (Spring)

* May also be taken through the National Law Center, with permission of the Dean of the National Law Center and of the instructor.

*231 **Law and Criminology I: Search for the Causes of Criminal Behavior** (3) — Courtless

Role which knowledge of crime causation may play in assessing devices to control deviant behavior; factors related to criminal behavior; current causal theories. (Fall)

*232 **Law and Criminology II: Society's Responses to the Criminal Offender** (3) — Courtless

Study of punitive, mechanical, and correctional approaches to offenders. Emphasis on changing responses to criminal and delinquent behavior, and research on effectiveness. (Spring)

*241 **Food and Drug Law** (3) — Kaplan

The Federal Food, Drug, and Cosmetic Act, and related laws. Consumer, government, and industry viewpoints. (Fall)

251 **Moot Court** (3) — Staff

Students will prepare and present direct testimony, under cross examination by an experienced trial attorney, in simulated courtroom setting. Class discussions of problems, techniques. Lectures on discovery, admissibility of scientific evidence, chain of custody, use of notes, etc.

254 **Seminar: Selected Topics in the Forensic Sciences** (3) — Crown

Exploration of selected current issues in research, investigation, and law.

260 **Introduction to Human Physiology and Pathology** (3) — Froede

Introduction to physiology and pathology of the human body; emphasis on medical terminology. Basic understanding of the body functions in health and disease. (Fall)

261 **Introduction to Forensic Pathology** (3) — Stahl, Herzog, Sopher

Terminology and scientific techniques used in medicolegal investigations, sudden or unexpected deaths, homicides, suicides, accidental deaths, and trauma. (Fall)

262 **Current Trends in Forensic Pathology and Forensic Odontology** (3) — J. Johnson

Emphasis on (1) the relationship among law, medicine, and law enforcement; and (2) the advancement of forensic knowledge. (Fall)

263 **Seminar: Law, Medicine, and Forensic Sciences** (3) — Staff

Emphasis on the introduction of forensic science data/evidence in civil and criminal cases. (Spring)

264 **Medical Jurisprudence** (3) — Zimmerly

Legal problems inherent in the practice of medicine. Laws regulating health personnel and health industry. Emphasis on professional liability.

266 **Forensic Neuropathology** (3) — Earle

Fundamentals of neuropathology of natural disease and traumatic in-

* May also be taken through the National Law Center, with permission of the Dean of the National Law Center.

juries of the nervous system, including demonstrations of gross pathologic specimens. (Spring)

267 **Applications of Histochemistry to the Forensic Sciences** (3) F. Johnson
Chemical and physical methods for the localization, identification, and characterization of materials under the microscope, including carbohydrates, enzymes, lipids, minerals, pigments, and proteins. (Spring)

268 **Photography in the Forensic Sciences** (3) Staff
Basic use of forensic photography, including selection and use of equipment, photographs as evidence, close-up work, and common misconceptions. Laboratory fee, $25.

269 **Principles of Forensic Toxicology** (3) Goldbaum
Analytical procedures used for the detection of drugs, poisons, and toxic agents in biological specimens. Admission by permission of instructor. (Spring)

271 **Forensic Serology** (3) Staff
Advanced techniques in forensic serology and enzymology. Emphasis on practical laboratory examinations and classifications of dried blood stains. Among systems presented are ABO and subgroups, MN, rhesus, and phosphoglocumutase erythrocyte acid phosphatase, and adenylate kinase isoenzymes. Laboratory fee, $25. Prerequisite: ForS 201, or permission of instructor. (Spring)

281–82 **Advanced Instrumental Analysis** (3–3) Staff
Lectures and demonstrations in the uses of instrumentation, including emission spectrograph, visible spectrophotometer, infrared spectrophotometer, gas chromatograph, thin layer chromotography, atomic absorption, X-ray diffraction spectrometer, mass spectrograph, neutron activation analysis, and the electron scanning microscope. (Fall and spring)

295 **Research** (arr.) Staff
Open to qualified Master's degree students. Research on problems approved by the Chairman of the Department or academic adviser, under the supervision of an appropriate staff member. Laboratory exercises in those methods in principal use in crime laboratories. (Fall and spring)

298 **Forensic Sciences Practicum** (arr.) Staff
Open to qualified master's degree students. Internship experience in a crime laboratory or criminal justice agency, under the supervision of an appropriate staff member. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

French

See "Romance Languages and Literatures."

Genetics—Graduate Study

COMMITTEE ON GENETICS

S.O. Schiff (*Chairman*), Rosalie De Giovanni-Donnelly, G.S. Edwards, W.G. Flamm, T.B. Friedman, R.C. Gallo, J.C. Houck, C.B. Jacobson, Kenneth Krell, W.M. Leach, C.D. Lytle, C.R. Merril, John Minna, W.G. Nash, J.C. Petricciani, Jeffrey Schlom, Sandra Smith-Gill

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Science and Doctor of Philosophy in the field of Genetics. This program is directed by a Committee whose members are drawn from the departments of Biochemistry, Biological Sciences, Child Health and Development, Microbiology, Obstetrics and Gynecology, and Pharmacology; and from three government agencies—the Bureau of Radiological Health, the National Institutes of Health, and the National Institute of Mental Health.

A baccalaureate degree is required for admission to the degree program. The undergraduate program must have included the following: 8 semester hours each in biology, inorganic chemistry, and organic chemistry; 6 to 8 semester hours in physics; and 6 semester hours of English composition and literature. While not required for admission, courses in embryology, histology, genetics, and mathematics are strongly recommended.

Master of Science in the field of Genetics.—Required: the general requirements, pages 93–100. The 30 semester hours required in this program must include Gnet 201–2 and Gnet 299–300. The remaining 20 semester hours of course work are to be selected, with the approval of the Committee on Genetics, from the departmental courses listed below. The tool requirement may be met by the satisfactory completion of an approved course in biostatistics or the passing of a foreign language reading examination.

Doctor of Philosophy in the field of Genetics.—Required: the general requirements, pages 93–97, 100–102. The program of study must include Gnet 301–2, 8 to 10 semester hours of biochemistry, 6 to 8 semester hours of cell biology, 10 to 12 semester hours of genetics, and 2 or 3 semester hours of statistics. These courses may be selected from the departmental listings on pages 318–19. The tool requirement may be met by the satisfactory completion of an approved course in biostatistics and the passing of a foreign language reading examination, preferably in French or German.

GENETICS

THIRD GROUP

201–2 **Advanced Problems in Genetics** (2–2) Staff

Individual study with each member of the Committee on Genetics. Required of all Master's degree candidates in the field of Genetics. (Academic year)

225 **Genetic Aspects of Development** (2) Friedman

Aspects of genetic control and biochemistry of development in a variety of organisms. Prerequisite: a basic genetics course. (Spring)

295 **Research** (arr.) Staff

Open to qualified Master's degree students. Research on problems ap-

proved by the Committee on Genetics. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Academic year)

FOURTH GROUP

301–2 **Advanced Problems in Genetics** (2–2) Staff
Individual study with each member of the Committee on Genetics. Required of all students preparing for the Doctor of Philosophy general examination whose field of study is Genetics. (Academic year)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

ANATOMY

203 *Human Embryology* (1)
256 *Human Genetics* (1)
260 *Electron Microscopy in Cellular Biology—Lecture* (1)
261 *Electron Microscopy in Cellular Biology—Laboratory* (2)

BIOCHEMISTRY

221–22 *General Biochemistry* (4–5)
224 *Biochemistry of Enzymes* (1)
227 *Biochemistry Seminar* (1)
266 *Biochemical Genetics and Inherited Metabolic Diseases* (1)

BIOLOGICAL SCIENCES

BIOLOGY

108 *Organic Evolution* (3)
115 *Cytology* (4)
118 *Advanced Cytology* (3)
123 *Cell Biochemistry* (3)
124 *Cell Biochemistry Laboratory* (1)
127 *Genetics* (3)
138 *Advanced Genetics* (3)
167 *Radiation Biology* (3)
206 *Seminar: Radiation Biology* (3)
207 *Seminar: Origin of Life* (3)
227 *Seminar: Genetics* (3)

248 *Analysis of Development* (3)
249 *Seminar: Developmental Biology* (3)

ZOOLOGY

145 *Introduction to Vertebrate Embryology* (4)
146 *Experimental Developmental Biology* (4)

MICROBIOLOGY

214 *Tissue Cell Culture and Somatic Variation* (4)
231 *Immunobiology* (1)
233 *Biology of Viruses* (2)
234 *Biology of Viruses—Laboratory* (2)
258 *Microbial Genetics* (2)

OBSTETRICS AND GYNECOLOGY*

391 *Cytogenetics* (1)
392 *Reproductive Genetics* (1)
395 *Gametogenesis* (1)
399 *Medical Genetics* (1)

PHARMACOLOGY

203 *Fundamental Principles of Pharmacology* (2)
256 *Molecular Pharmacology* (2)
258 *Cancer Chemotherapy* (1)

PHYSIOLOGY

201 *Physiology* (8)

STATISTICS

91 *Principles of Statistical Methods* (3)
117 *Analysis of Variance* (3)
153–54 *Mathematical Models in Population Genetics* (3–3)

Geography and Regional Science

Professor Marvin Gordon (*Chairman*)
Professorial Lecturers J.W. Nystrom, Joseph Baclawski

* See the *School of Medicine and Health Sciences* catalogue.

Associate Professor J.C. Lowe
Associate Professorial Lecturer Philip True
Assistant Professors E.O. Pederson, K.J. Langran
Assistant Professorial Lecturer D.E. Starsinic

Bachelor of Arts with a major in Geography (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Required courses in the major—24 semester hours of second-group Geography and Regional Science courses, to be chosen in consultation with a departmental adviser.

Master of Arts in the field of Geography.—Prerequisite: a Bachelor of Arts degree with a major in Geography from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. The minimum requirement consists of 30 semester hours of approved course work including a thesis; with the approval of the Department, a student may elect a program of study without a thesis. A Master's Comprehensive Examination in three fields is required. Candidates must fulfill the tool requirement by either passing a reading knowledge examination in one foreign language or satisfactorily completing the tool requirement of 6 semester hours, selected from Stat 105, 117, 118, 155, 187, 188.

Bachelor of Arts in Education with a teaching field in Geography.—Prerequisite: the Education curriculum, page 79.

Required: the Geography option and the professional courses listed on pages 115, 120–21.

Master of Arts in Education with a field in Elementary or *Secondary Education (specializing in Geography).*—Prerequisite: a Bachelor's degree with sufficient concentration in Geography to permit successful pursuit of graduate study in the Department of Geography and Regional Science. Candidates must be accepted by both the School of Education and the Department of Geography and Regional Science.

Required: the general requirements, pages 125–27, including 15 semester hours of graduate courses in Geography and Regional Science.

FIRST GROUP

***26 Environmental Issues (3)** Langran, Schiff

An interdisciplinary analysis of selected aspects of the population question, pollution and human health, urban environmental problems, issues of economic growth and development, technology and public policy. (Spring)

51 Introduction to Geography (3) Staff

General survey of the systematic fields of human geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts. (Fall and spring)

52 Introduction to Economic Geography (3) Pederson

Examination of the basic principles which determine the location of economic activities on the surface of the earth. (Spring)

* Offered jointly by the Division of Experimental Programs and the departments of Biological Science and Geography and Regional Science

SECOND GROUP

104 **Special Techniques in Cartography** (3) Staff

Descriptive and statistical techniques applied to thematic mapping. Laboratory fee, $15.

106 **Introduction to Remote Sensing** (3) Staff

Examination of the principles and applications of remote sensing techniques using aerial photography and Earth Resources Technology Satellite (ERTS) imagery. Laboratory fee, $15. (Fall)

125 **Transportation Geography** (3) Lowe

Consideration of the spatial aspects of interaction, diffusion, and information transfer, including nodal activity and hierarchies, network geometry, gravity models, and diffusion processes. (Spring)

126 **Economic Geography** (3) Pederson

Theories concerning the location of economic activities. Exercises in computer-oriented locational analysis. Prerequisite: Permission of instructor. (Fall)

127 **Population and Settlement** (3) Starsinic

Patterns of world population; factors contributing to population pressures, growth, and migrations.

132 **Resource Management and Conservation** (3) Langran

Principles and practices in effective utilization of resources in the United States and selected areas; public policies relating to conservation; environmental systems, perception, and impact studies. (Fall)

134 **Geography of Water Resources** (3) Langran

Analysis of the spatial pattern of water resources in the United States; problems associated with current and future requirements; political decision-making processes and problems of governmental organization and intergovernmental arrangements. (Fall)

135 **Resources and Environmental Quality** (3) Langran

Analysis of the spatial pattern of resources; emphasis on the problems of international river basin and ocean resource management. (Spring)

139 **Geographic Perspectives on Current World Problems** (3) Staff

Consideration of the impact of contemporary changes in national resources and populations on political communities. (Spring)

140 **Urban Geography** (3) Pederson

Analysis of the internal spatial structure of cities; emphasis on explaining patterns of location within the city. (Fall)

141 **Urban Settlement** (3) Pederson

Distribution of urbanization on the surface of the earth; processes which lead to urbanization; theories which can be used to analyze the location of cities. (Spring)

142 **Urban Environments** (3) Lowe
(Formerly Urban Environments and Systems)
Consideration of the climatic, hydrological, and other selected aspects of the physical geography of the city as well as of the nature, organization and spatial patterns of urban delivery systems. (Spring)

143 **Social Geography** (3) Lowe
Consideration of behavioral aspects of geography incorporating spatial cognition, spatial behavior, social space, migration processes, and conflicts in spatial decision-making. (Fall)

144 **Environmental Adaptation** (3) Lowe
Consideration of the man-environment relationship; emphasis on bio-climatological responses, disease ecology, nutritional demands, land capabilities, artificial environments, and environmental perception.

145 **Cultural Geography** (3) Langran
Analysis of the relationships between culture and environment; emphasis on spatial and ecological considerations. (Spring)

146 **Political Geography** (3) Pederson, Nystrom
Analysis of the interrelationships between the political community and the human and physical environment. (Fall and spring)

161 **Latin America** (3) Gordon
Examination of spatial characteristics of physical and cultural phenomena in Middle and South America. (Spring)

164 **Geography of China** (3) Gordon
Survey of the cultural and physical regional patterns of China.

189–90 **Readings in Geography** (arr.) Staff
(Academic year)

198 **Current Geographic Topics** (3) Pederson
A consideration of geographic aspects of topical and future problems of society. Topics change each year. Topic for fall: Regional Development. Topic for spring: World Food Problems. May be repeated for credit.
(Fall and spring)

THIRD GROUP

*215 **Field Methods in Cultural Ecology: Settlement Patterns in Pre-Columbian Mesoamerica** (3 or 6) Humphrey, Langran
Field and laboratory examination of settlement patterns and sociologic structures in pre-Columbian Mesoamerica and their relationships to agricultural water-control systems.

221 **Seminar: Cultural Geography** (3) Langran
Study of the noneconomic processes which affect the location of human

* An interdepartmental course offered by the departments of Geography and Regional Science and Anthropology.

activity. Topics to be discussed are environmental perception and evaluation, social definitions of space, and diffusion of innovations.

222 **Seminar: Resources and the Environment** (3) Langran
(Formerly Techniques of Resource Inventory)
Analysis of the spatial variations and interrelationships of resources and the environment. (Fall)

223 **Seminar: The Population-Food Balance** (3) Gordon
(Formerly Population and Resources)
Analysis of spatial problems associated with the dynamics and interaction of population growth and agricultural output. (Spring)

224 **Seminar: Political Geography** (3) Pederson
Examination of the political factor in location theory and analysis of the nature of political territories. (Spring)

225 **Seminar: Transportation Geography** (3) Lowe
Analysis of human spatial interaction; emphasis on networks, graph theory, gravity, interaction and potential models, migration models and diffusion processes.

243 **Seminar: Urban Geography** (3) Lowe
Functional processes affecting the evolving morphology and internal spatial patterns of urban phenomena; emphasis on economic factors, behavioral considerations, and impact of time. (Fall)

244 **Seminar: Urban Systems** (3) Pederson
Examination of central place theory and other theories of urban location.

261 **Seminar: Geography of Latin America** (3) Gordon
Analysis of man-land relationships in Latin America. (Spring)

265 **Seminar: Geography of the Soviet Union** (3) Baclawski
Physical features, economic geography, natural and energy resources, industries, transportation, agriculture, population trends; emphasis on population patterns along borderlands, especially Sino-Soviet border. (Spring)

266 **Seminar: Geography of China** (3) True
Physical and economic geography; emerging industries, energy resources, transportation system. Emphasis on population distribution and growth; regional geography of selected areas. (Fall)

287 **Seminar: Problems in Latin American Civilization** (3) Staff
Interdisciplinary seminar partially guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspect of a selected key theme. Admission by permission of instructor. (Fall and spring)

295 **Research** (arr.) Staff
May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

Geology

Professors Geza Teleki (*Chairman*), G.V. Carroll, F.R. Siegel, A.G. Coates
Adjunct Professors J.W. Pierce, E.G. Kauffman, I.G. Sohn
Professorial Lecturers Nicholas Hotton, Daniel Appleman, Isidore Zietz
Associate Professors R.C. Lindholm, J.F. Lewis
Associate Professorial Lecturers W.E. Maloney, M.A. Buzas, J.E. Hazel, Alfonso Geiger, M.D. Turner
Assistant Professorial Lecturers F.J. Collier, T.L. Hughes, E.T. Miller

Bachelor of Arts or *Bachelor of Science with a major in Geology (Departmental).*—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Required introductory course—Geol 21–22.
3. Required courses in related areas—(a) Chem 11–12; (b) Math 30 (for the degree of Bachelor of Arts) or Math 30 and 31 (for the degree of Bachelor of Science); (c) Stat 91; and (d) BiSc 11–12 or Phys 3 and 4 (for the degree of Bachelor of Arts) or BiSc 11–12, *and* Phys 1 or 3 (for the degree of Bachelor of Science).
4. Required courses in the major—Geol 111, 112, 117, 118, 122, 151–52 for both the degree of Bachelor of Arts and Bachelor of Science; Geol 172, 189, 195 for the Bachelor of Science degree only.

Bachelor of Science with a major in Geology—Engineering option (Engineering Geology) (Departmental).—An interdisciplinary curriculum offered by the Department of Geology and the Department of Civil, Mechanical, and Environmental Engineering in the School of Engineering and Applied Science. (Students wishing to work toward the degree of Bachelor of Science (Civil Engineering) with a Geology option (Geological Engineering) should consult the School of Engineering and Applied Science Catalogue.) The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Required introductory courses—ApSc 57, 58; Chem 13; EE 51; Geol 21–22; Math 30, 31, 33; Phys 1, 2.
3. Required courses in the major: CE 120, 140, 166, 167, 168, 182, 185; Geol 111–12, 117, 118, 122, 136, 189, 195, and one course chosen from Geol 128, 141, or 163; Math 111, 112; ME 126, 131.

Master of Arts or *Master of Science in the field of Geology.*—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Geology from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. Master of Science degree candidates must include in their program of study Geol 141, 163, 205, and 266. Geol 299–300 *Thesis Research* is required for both degrees. Candidates must pass a Master's Comprehensive Examination before submitting their thesis work. A reading knowledge examination in French, German, or Russian must be passed before beginning the thesis work or before beginning the third semester of graduate work; other languages may be taken with permission of Department. With the permission of the Department, candidates in the Master of Science program may substitute another approved tool subject in lieu of the foreign language requirement.

Master of Science in the field of Geochemistry (an interdepartmental degree offered by the departments of Geology and Chemistry).—Prerequisite: a Bachelor's degree with a major in Geology or in Chemistry from this University, or an equivalent degree.

Required: the general requirements, pages 93–100, including Chem 111–12; Geol 141, 241, 249; Geol 246 or Chem 213; and Geol 299–300. The Master's Comprehensive Examination must be taken before registration for the second half of the thesis work. A reading knowledge examination in a foreign language, approved by the Department of Geology or Chemistry, must be passed prior to beginning the third semester of graduate work or before beginning the thesis work, whichever occurs first.

Master of Science in the field of Engineering Geology.—An interdisciplinary degree offered by the Department of Geology and the Department of Civil, Mechanical, and Environmental Engineering in the School of Engineering and Applied Science.

Prerequisite: A Bachelor of Science degree in Geology or a Bachelor of Science (Civil Engineering) degree from this University or an equivalent degree which must include those courses or their equivalents as outlined for the undergraduate requirements in the field of geology with the engineering option (Engineering Geology). With the permission of the Department, a student may elect a program of study consisting of 36 semester hours of approved course work without a thesis. (Students wishing to work toward a Master of Science degree in the field of Geotechnical Engineering should consult the School of Engineering and Applied Science Catalogue.)

Required: (a) The general requirements, pages 93–100; (b) Geology—at least 12 semester hours to include Geol 128, 141, 163, and 205; (c) Engineering and Physical Science—at least 12 semester hours to be selected from ApSc 211, 213; CE 204, 205, 206, 207, 208, 209, 212, 216, 217, 218, 219, 221, 255, 256, 257, 263, 265, 271, 275, 276; ME 221, 227, 231, 261, 262; ES 228.

Doctor of Philosophy in the field of Geology.—Required: the general requirements, pages 93–97, 100–102, including passing a reading knowledge examination in an approved foreign language and one other approved tool subject; and the satisfactory completion of the General Examination in three fields, one of which must be in Petrology, Stratigraphy, or Structural Geology.

Research fields: Geomorphology, Marine Geology, Mineralogy, Paleontology, Petrology, Sedimentology, Stratigraphy, and Structural Geology.

Doctor of Philosophy in the field of Geochemistry (an interdepartmental field offered by the departments of Geology and Chemistry).—Required: the general requirements, pages 93–97, 100–102, including passing a reading knowledge examination in an approved foreign language plus the satisfactory completion of Stat 117 and 118, or 91; and the satisfactory completion of the General Examination in four fields, including geochemistry and chemistry.

Bachelor of Arts in Education with a teaching field in Earth Science.—Prerequisite: the Education curriculum, page 79.

Required: the Earth Science option and the professional courses listed on pages 113, 120–21.

FIRST GROUP

1–2 Introductory Geology for Nonscience Majors (3–3) Staff

Lecture (2 hours), laboratory (2 hours). Survey covering the principles of geology; emphasis on man's effect on the environment. Laboratory fee, $15 a semester. (Academic year)

5 Environmental Geology (3) Siegel, Teleki

The relation of man and society to natural environment; population

evolution and mineral resources; economic, legal, and political aspects. Laboratory fee, $15. (Fall and spring)

14 **Field Petrology** (3) Carroll

Lecture (2 hours), laboratory and field (3 hours). Field study of rocks. Laboratory fee, $12. Prerequisite: Geol 1–2. (Fall)

21–22 **Physical and Evolutionary Geology** (3–3) Lindholm, Coates

Lecture and laboratory (5 hours). Principles of geology as a base for further study in geology and related sciences. Laboratory fee, $15 semester. (Geol 21—spring; Geol 22—fall)

SECOND GROUP

101 **History of Geological Sciences** (3) Telek

Development of scientific thought; history of geological and related sciences. (Fall)

111 **Mineralogy** (3) Carroll

(Formerly Mineralogy [4])

Lectures and laboratory. Morphological crystallography and systematic mineralogy. Prerequisite: Geol 1 or 21. Laboratory fee, $15. (Spring)

112 **Crystal Optics** (4) Carroll

(Formerly Mineralogy [3])

Lectures and laboratory. Optical phenomena of crystals and uses of the polarizing microscope. Prerequisite: Geol 111 or Phys 3, or permission of instructor. Laboratory fee, $18. (Fall)

113 **Crystallography** (3) Appleman

Point-group and space-group theory, fundamentals of crystal structure. X-ray diffraction theory and application. Prerequisite: Math 31. Laboratory fee, $15. (Fall or spring)

117 **Petrology** (2) Lewis

Introduction to silicate phase systems; physics and chemistry of crustal and magmatic processes; volcanic processes and products. Prerequisite: Geol 21, 111–12; Phys 1 or equivalent; or permission of instructor. (Spring)

118 **Petrology Laboratory** (2) Lewis

Concurrent registration in Geol 117 required for Geology majors. Prerequisite: Geol 111. Laboratory fee, $18. (Spring)

122 **Structural Geology** (4) Carroll

Lectures and laboratory. Interpretation of geologic formations on basis of their structures. Prerequisite: Geol 22, or Geol 2 and 14. Laboratory fee, $22. (Spring)

125 **Marine Geology** (3) Pierce

Lecture and map work. Principles of oceanography and submarine geology; topography, crustal structure, sedimentary processes, and marine

environment. Prerequisite: Geol 1–2 or 21–22; or permission of instructor. (Spring)

128 **Geomorphology** (3) Teleki

Lecture (2 hours), laboratory as arranged. Nature and evolution of earth forms. Laboratory fee, $15. (Spring)

136 **Engineering Geology** (3) Geiger

For students in the School of Engineering and Applied Science. Geological principles and processes and their application to civil and mechanical engineering. Prerequisite: Math 31, Phys 2 or 4; or permission of instructor. (Spring)

141 **Introductory Geochemistry** (3) Siegel

Principles and theories on the abundance, relationships, and distribution of the elements in various rock and mineral species. Prerequisites or concurrent registration: Geol 117 or equivalent; Chem 11–12; Math 30; Phys 1 or 3; or permission of instructor. Laboratory fee, $15. (Fall)

147 **Chemical Geology in the Earth and Ocean Sciences** (3) Siegel

Introduction to geochemical and chemical principles involved in geological systems and their application to contemporary problems in oceanology, pollution, and mineral exploration. Laboratory fee, $12.

151–52 **Invertebrate Paleontology** (3–3) Coates

Lecture and laboratory (5 hours), field trips as arranged. A systematic treatment of the invertebrate fossil groups, emphasis on the macroinvertebrates. Prerequisite: Geol 1–2 or 21–22; or permission of instructor. Laboratory fee, $15 a semester. (Academic year)

154 **Vertebrate Paleontology** (3) Hotton

Lecture (2 hours), laboratory or field as arranged. General features of vertebrate morphology and evolution; problems of paleoecology and adaptation. (Fall)

157 **Methods of Systematic Paleozoology** (3) Sohn

Lecture and discussion. Introduction to bibliographic source and rules of zoological nomenclature. Presentation of data, including synonymies and keys. Prerequisite: Geol 151–52 or permission of instructor. (Spring)

158 **Micropaleontology** (3) Sohn

Lecture (2 hours), laboratory as arranged. Identification with binocular microscope of important microfossil groups. Micropaleontological techniques. Prerequisite: Geol 157 or permission of instructor. Laboratory fee, $12. (Fall or spring)

163 **Sedimentation** (4) Lindholm

Lecture (2 hours), laboratory (4 hours), field trips as arranged. Principles of sedimentation, analysis and interpretation of sedimentary processes and environment, laboratory experiments in the properties of sedimentary particles. Prerequisite: Geol 111 or permission of instructor. Laboratory fee, $15. (Fall)

172 **Regional Geology of North America** (2) Staff

Lecture, research, and discussion of major geologic or physiographic regions. Prerequisite: Geol 122. (Fall)

181 **General Oceanography** (3) Maloney

Chemical and physical properties of sea water, movements of water masses, meteorological interrelations, ecology of marine plants and animals. Prerequisite: Math 31 or equivalent, or permission of instructor. (Spring)

189 **Geophysics of the Solid Earth** (2) Zietz

Introduction to physical properties and origin of the surface features and interior of the earth. Prerequisite: Phys 1 or 3; or permission of instructor. (Fall)

195 **Field Work** (2) Staff

Weekend field trips. Surveying, geological mapping, and specific field work methods. (Spring)

199 **Undergraduate Research or Reading** (arr.) Staff

Problems approved by the staff. May be repeated once for credit. (Fall and spring)

THIRD GROUP

205 **Seminar in Geology** (3) Staff

Special topics each semester. May be repeated for credit. (Fall and spring)

214 **X-ray Mineralogy** (3) Appleman

Problems in X-ray mineralogy, crystal chemistry of rock-forming minerals. Laboratory fee, $15. (Fall or spring)

216 **Sedimentary Petrography** (3) Lindholm

Identification, classification, and interpretation of common sedimentary rocks by means of the petrographic microscope. Prerequisite: Geol 111, 163; or permission of instructor. Laboratory fee, $15. (Spring)

219 **Petrogenesis I** (3) Lewis

The origin of selected igneous and metamorphic rock types. Laboratory fee, $15. (Fall)

220 **Petrogenesis II** (3) Lewis

Laboratory fee, $15. (Spring)

224 **Advanced Structural Geology** (3) Lewis

Rock deformation. Methods of study and the formation of structurally complex rock. Tectonics. Prerequisite: Geol 122 or permission of instructor. (Fall)

241 **Geochemistry** (3) Siegel

Chemical composition and physical properties of sea water, chemical composition and alterations of marine sediments, thermodynamics and bio-

chemical activity in oceans. Methods of analysis and problems of measuring. Prerequisite: Math 31 and permission of instructor. Recommended: Chem 22. Laboratory fee, $18.

243 **Geochemical Prospecting** (3) Siegel

Application of geochemical principles and analyses to the detection of hidden ore deposits. Field trips as arranged. Laboratory fee, $15. (Spring)

246 **Physical Chemistry in Relation to Geologic Problems** (3) Staff

Application of thermodynamics to phase equilibria studies of minerals and rocks.

249 **Seminar: Geochemistry** (2) Siegel

Independent topics each semester; may be repeated for credit. (Fall or spring)

253 **Bioassociational Studies in Paleontology** (3) Hazel

Analysis and interpretation of the distribution of marine animals with emphasis on biogeographic, paleoclimatologic, and biostratigraphic inferences and multivariate techniques.

254 **Interpretive Paleontology** (3) Kauffman

Comparative study of form and function in fossil and recent organisms as related to the interpretation of evolution. Prerequisite: Geol 151–52. (Spring)

255 **Population Paleoecology** (3) Buzas

Characteristics of populations applicable to the fossil record. Subject matter includes ecosystem concept, habitat, Hutchinsonian niche, life-death, size-frequency distributions, competitive exclusion principle, spatial distributions, relative abundance and diversity, quantification of community biofacies. Prerequisite: Geol 151–52, Stat 91; or permission of instructor. (Fall)

263 **Advanced Sedimentology** (arr.) Pierce

Prerequisite: Geol 163. Laboratory fee, $15.

266 **Stratigraphy** (3) Coates, Kauffman

Physical and biological stratigraphy. Analysis of major facies types.

288 **Geophysics for Geologists** (3)

Basic geophysics to assist the geologist in mapping and solving geologic problems. Prerequisite: Math 31; Phys 1, 2; or permission of instructor. (Fall)

295 **Research** (arr.)

Research on problems approved by the Staff. Open to qualified students with advanced training. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Germanic Languages and Literatures

Professors J.C. King, Klaus Thoenelt
Associate Professor Carl Steiner (*Chairman*)
Assistant Professorial Lecturer Margaret Guenther
Instructor B.K. Netland
Lecturers Blanche Gardner, Peter Werres

Bachelor Arts with a major in Germanic Languages and Literatures (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—Germ 1–2, 3–4, 9–10, 51–52; or equivalent.
3. Required courses in other areas—6 semester hours of history, and 6 semester hours in one of the following subjects: art history, music history, or philosophy.
4. Requirements for the major—a minimum of 24 semester hours in German courses above the first group, including Germ 179–80; reasonable proficiency in speaking, reading, and writing German.

Master of Arts in the field of Germanic Languages and Literatures.—Prerequisite: a Bachelor of Arts degree with a major in Germanic Languages and Literatures from this University, or an equivalent degree.

Required: the general requirements, pages 93–100, including a reading knowledge of French. The program of study consists of (1) 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours) in the field of German literature or linguistics or, with departmental approval, (2) 30 semester hours of approved course work without a thesis.

Bachelor of Arts in Education with a teaching field in German.—Prerequisite: the Education curriculum, page 79.

Required: the German option and the professional courses listed on pages 116, 120–21.

The Department of Germanic Languages and Literatures, through the Consortium of Universities of the Washington Metropolitan Area, Inc., cooperates in a program leading to the degree of Doctor of Philosophy at Georgetown University.

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

GERMAN

FIRST GROUP

1–2 **First-year German** (3–3) Staff

Fundamental concepts of German culture; essentials of German structure and basic vocabulary; reading of easy prose and conversation. Aural-oral practice in language laboratory. Prerequisite to Germ 2: Germ 1. Laboratory fee, $17.50 a semester. (Germ 1 and 2—fall and spring)

*3–4 **Second-year German** (3–3) Staff

Introduction to German civilization, selections from modern German prose, continuation and review of German structure, conversation and simple composition. Aural-oral practice in language laboratory. Prerequisite to Germ 3: Germ 1–2 or equivalent. Prerequisite to Germ 4: Germ 3. Laboratory fee, $17.50 a semester. (Germ 3 and 4—fall and spring)

*9–10 **German Conversation and Composition** (3–3) Staff

(Academic year)

47 **Beginning German for Reading Acquisition** (3) Staff

For undergraduates and graduate students with little or no German who are interested in acquiring a reading knowledge of German. No academic credit for graduate students. (Fall)

49 **German Readings for Nonmajor Students** (3) Staff

Primarily for graduate students preparing for reading examinations, undergraduates admitted. No academic credit for graduate students. Prerequisite: Germ 4 or 47, or equivalent. (Spring)

51–52 **Introduction to German Literature—in English** (3–3) Guenther

Lecture, recitation, and discussion. Selected readings in German literature from the earliest periods to the present. (Academic year)

SECOND GROUP

103–4 **Major Themes of German Literature—in English** (3–3) Thoenelt

Lecture and discussion. Selected works of Goethe, Thomas Mann, Hesse, Böll, and others. Topics for 1976–77: Germ 103—the "Faust" theme in German thought and civilization, from Goethe to Thomas Mann; Germ 104—the anti-Faust movement in German thought and civilization from Goethe to Heinrich Boll. (Academic year 1976–77 and alternate years)

111–12 **Comparative Studies in Germanic Literatures—in English** (3–3) Thoenelt

Lecture and discussion. Topics for 1975-76: Germ 111—Absurdity and rebellion, loss and rediscovery of the self, from Existentialism back to Enlightenment, selected works of Thomas Mann, Böll, Frisch, Hesse, Strindberg, Goethe, and others; Germ 112—Individualism in German thought and civilization; the meaning of truth in education and self-realiza-

* With permission of instructor, Germ 9 or 10 may be taken concurrently with Germ 4.

tion as reflected in German 18th and 20th century literature, selected works of Goethe, Novalis, Thomas Mann, Böll, and others. (Academic year 1975-76 and alternate years)

131–32 **18th Century German Literature—in German** (3–3) Thoenelt
Enlightenment, Storm and Stress, Classicism. Reading, lecture, and discussion. Central topic: Geist und Tat—or the 18th century concept of literature's formative function in society. (Academic year 1975–76 and alternate years)

141–42 **19th Century German Literature—in German** (3–3) Steiner
Romanticism, Biedermeier, Young Germany, Realism. Reading, lecture, and discussion. (Academic year 1976–77 and alternate years)

151–52 **20th Century German Literature—in German** (3–3) Steiner
The age of Nietzsche, Naturalism, Impressionism, Expressionism; Kafka, Thomas Mann, Hesse; émigré literature, contemporary drama; authors of Gruppe 47. Reading, lecture, and discussion. (Academic year 1975–76 and alternate years)

161–62 **Studies in Modern German Literature—in English** (3–3) Steiner
Readings of representative writers of modern German prose; lecture and discussion in English. (Academic year 1976–77 and alternate years)

179–80 **Advanced German Conversation and Composition** (3–3) Thoenelt
Discussions and compositions on literary and cultural topics, readings of newspaper articles, interpretations of selected texts (Gottfried Benn and Thomas Mann), grammar and style studies. (Academic year 1976–77 and alternate years)

THIRD GROUP

201–2 **Middle High German** (3–3) King
(Academic year 1975–76 and alternate years)

209–10 **Old High German** (3–3) King
(Academic year 1976–77 and alternate years)

211–12 **History of the German Language** (3–3) King

213–14 **Old Norse** (3–3) Allee
(Academic year 1975–76 and alternate years)

225–26 **Seminar: Linguistics** (3–3) King, Allee
Bibliography, methodology, readings, and research problems.

231–32 **German Classicism** (3–3) Thoenelt
Advanced study and critique of the literature of the Goethe era. The 18th century image of man; literature and society; the regenerative function of aesthetics, and the establishment of criteria for "Kunst" and "Kitsch." (Academic year 1976–77 and alternate years)

251–52 **Seminar: Studies in 20th Century German Literature** (3–3) Steiner

Special projects in fiction, drama, poetry, and criticism. Topic for 1976–77: *Das deutsche Drama nach 1945.* (Academic year 1976–77 and alternate years)

271–72 **Seminar: German Realism** (3–3) Steiner

Analysis of authors, works, genres, and literary trends. Topic for 1975–76: *Die Novelle des poetischen Realismus.* (Academic year 1975–76 and alternate years)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

SANSKRIT

SECOND GROUP

105–6 **First-year Sanskrit** (3–3) King

A year course: credit toward a degree at this University given on completion of Germ 106. Language, literature, and culture of ancient India. Essentials of grammar; reading of classical and Vedic texts. Aural-oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Academic year 1975–76 and alternate years)

107–8 **Second-year Sanskrit** (3–3) King

A year course: credit toward a degree at this University given on completion of Germ 108. Language, literature, and culture of ancient India. Continuation and review of grammar; reading of more difficult classical and Vedic texts. Aural-oral practice in language laboratory. Prerequisite: Germ 105–6 or equivalent. Laboratory fee, $17.50 a semester. (Academic year 1976–77 and alternate years)

SCANDINAVIAN

FIRST GROUP

81–82 **Beginning Scandinavian** (3–3) Netland

Introduction to Norwegian and introductory reading approach to Danish and Swedish. Fundamental concepts of Scandinavian civilization. Scan 81: Norwegian, language and structure; reading, conversation, and composition. Presentation of Scandinavian culture. Scan 82: additional reading, conversation, and composition in Norwegian. Reading approach to Danish and Swedish. Credit will be given for each semester. Aural-oral practice in language laboratory. Laboratory fee, $17.50 a semester. Prerequisite to Germ 82: Germ 81. (Academic year)

83–84 **Intermediate Scandinavian** (3–3) Netland

Intermediate Norwegian; reading, conversation, and composition. Additional reading in Danish and Swedish. Outlines of modern Scandinavian culture, including a brief introduction to Icelandic. Students will select a special study project within the course framework. Credit will be given

for each semester. Aural-oral practice in language laboratory. Laboratory fee, $17.50 a semester. Prerequisite to Germ 83: Germ 82 or equivalent. Prerequisite to Germ 84: Germ 83. (Academic year)

Greek

See "Classics."

Health Care Administration

Professor Leon Gintzig (*Chairman*)
Professorial Lecturers H.L. Hirsh, W.A. Hamrick
Associate Professors R.R. Bonato (*Research*), G.E. Morris, M.C. Devolites, P.N. Reeves, K.J. Darr
Adjunct Associate Professors P.S. Birnbaum, A.J. Schwab
Associate Professorial Lecturers W.A. Parker, D.D. Pointer, Aladino Gavazzi, L.W. Katz, H.R. Wertlieb, Sami Khoury, C.C. Rorrie, A.E. Duncker
Assistant Professors W.H. Guy (*Research*), K.C. Yang (*Research*), R.G. Shouldice
Adjunct Assistant Professors W.J. Auton, J.D. Bentley, W.J. Green, Jr., W.J. Landen, R.L. White, M.J. Ackerman
Assistant Professorial Lecturers T.L. Schmidt, N.B. Hadley
Instructors Patricia Cleary (*Research*), Richard Switalski (*Research*), D.F. Bergwall, C.P. McKelvey
Adjunct Instructors G.R. DeLisle, S.T. Fisher, R.B. Hinds, N.G. Oglesby, F.W. Carter, C.H. Hayes

The program of study leading to the degree of *Bachelor of Science in Health Care Administration* is currently being offered only at the Naval School of Hospital Administration; for further information contact the Chairman of the Department of Health Care Administration.

Programs of study in Health Care Administration leading to the degrees of *Master of Arts in Health Care Administration, Master of Business Administration, Master of Public Administration, Post-Master's Graduate Certificate in Health Care Administration, Doctor of Business Administration,* and *Doctor of Public Administration* are offered by the School of Government and Business Administration (see pages 133–63).

SECOND GROUP

Except for HCA 153 and 154, the following second-group courses are limited to students in the Bachelor of Science in Health Care Administration degree program at the Naval School of Hospital Administration.

Stallings

108 **Survey of Health Economics** (3)

Survey of the principles and applications of economic analysis as applied to the health field. Economic criteria required for cost effectiveness, operations analysis, and resources management.

110 **Introduction to Health Care Planning** (3) Fisher, Schmidt

Introduction to health care program and facility planning. Emphasis on the role and function of planning agencies, estimation of needs, assessment of community and facility resources, collection of data, and evaluation of program and facility design.

120 **Personnel Relations in Health Care Institutions** (3) Fisher

Introduction to personnel relations in the health care environment. Research studies, as they pertain to the concepts of leadership and superior-subordinate relations in a multidisciplinary organization, evaluated for practical application. Emphasis on employee cooperation, differences in ability and background, and particular problems caused by specific working conditions.

130 **Hospital Labor Relations** (3) Fisher

Introduction to a brief history of unionism, characteristics of union organizations and union movements, and the basic reasons why the government became involved in employer-employee relations. Labor laws and National Labor Relations Board decisions studied in terms of their application to health care facilities. Management's role in the collective bargaining process and the administration of and "living" with collective bargaining agreements.

140 **Hospital Financial and Material Management** (3) Hinds

Principles, practices, functions, and objectives of financial and material management in support of hospital operations; emphasis on the role and contributions of middle management. Costs and budgetary control, responsibility accounting, cost-based budgets, purchasing, inventory control, distribution, and storage.

142 **Financial Management in Health Care Institutions** (3) Hinds

Consideration of the nature, analysis, and interpretation of accounting data. Cost accounting, budgeting, and internal control techniques, emphasis on their use in the management planning and control process.

153 **Survey of Health Care Organization** (3) Parker, Bentley

Introduction to the organization and delivery of health care services in the United States. Emphasis on the structural features of and the resources available to the health care system. **(Fall and spring)**

154 **Introduction to Hospital Management and Procedures** (3) Parker, Fisher

Introduction to the structure and management of contemporary American hospitals; emphasis on the organization of hospital departments and on the functions of the department manager. **(Fall and spring)**

155 **Special Problems in Health Care Management** (3) DeLisle

Supervised reading program in which the student is expected to review the literature on a middle-management problem present in contemporary American health care institutions.

159 **Legal Issues in Health Care Administration** (3) Landen

Recognition and comprehension of areas of legal liability in hospital activities. Knowledge and understanding of a wide variety of administra-

tive duties and responsibilities of a legal nature, such as administrative investigations, misconduct and line of duty determinations, administrative discipline and discharge, claims under the Medical Care Recovery Act, Federal Tort Claims Act, and other related matters.

162 **Survey of Hospital Informations Systems** (3) Ackerman

Development and discussion of a computerized integrated information system, its effect on the environment, and its use within the organizational system for planning and control. Analysis of actual information systems used in hospitals.

170 **Quantitative Methods in Health Care Administration** (3) Bentley

Introduction to the application of quantitative methods to the health services industry. Fundamental statistical techniques enabling the student to read, comprehend, critically appraise, and intelligently utilize the growing volume of quantitative research appearing in the health services literature. Familiarization with quantitative procedures applied to analyzing management problems in the operational environment. Emphasis on establishing a fundamental understanding of statistical "ideas" rather than upon manipulating predeveloped formulas.

175 **Analysis in Health Care Administration** (3) White

Skills, methods, research, and analysis of the middle management problem in health care administration.

180 **Management Case Problems in Hospital Administration** (3) Oglesby

Study of the management functions as applied in the hospital setting. Management case problems in hospital administration areas such as authority relationships, communication barriers, motivation and productivity, and control techniques discussed and analyzed.

THIRD GROUP

202 **Introduction to Health Care** (3) McKelvey, Khoury

Lecture and discussion (2 hours), laboratory (2 hours). Introductory description and analysis of the American health and medical care systems and the organization, characteristics, and relationships of research, technology, manpower, public and private delivery, and financing mechanisms. Survey of major disease problems and their impact on administration and planning. Medical terminology. (Fall and spring)

203 **Organization and Management of Health Care Institutions** (3) Darr, Hadley

(Formerly Health Care Organization and Management)

Lecture and discussion (2 hours), laboratory (2 hours). History and current character of institutional providers of health care. Function, organizational structure, and interrelationships of various types of health care facilities. Institutional ethics; statistics. Regulation of institutional providers. (Fall and spring)

204 **Management of Health Maintenance Organizations** (3) Shouldice

Basic principles and fundamentals of prepaid group practice plans and newly forming health maintenance organizations. Emphasis on planning, development, and operation of prepaid plans. (Fall and spring)

205 **Hospital Administrative Practices** (3) Darr, Gavazzi
(Formerly Hospital Management Procedures)
Lecture and discussion (2 hours), laboratory (2 hours). Organization, management, and interrelationships of hospital clinical, support, and administrative departments. Analyses of procedures and systems. Hospital personnel administration. Administrative ethics. Requirements of the Joint Commission on Accreditation of Hospitals. Prerequisite: HCA 203. (Fall and spring)

206 **Case Studies in Health Care Administration** (3) Devolites, Birnbaum
Discussion (2 hours), laboratory (2 hours). Intensive qualitative and quantitative analyses of major problem areas in health care administration using the case study method. Cases cover the broad spectrum of health care delivery and management: plans and operations, personnel, financial, and materiel. Developing and implementing solutions serves as capstone course for health care administration students. Prerequisite: HCA 202, 203, and Mgt 201. (Fall and spring)

207 **Management Analysis in Health Care Institutions** (3) Shouldice, Bergwall
Lecture (2 hours), laboratory (2 hours). Basic investigation and problem-solving techniques, including various methods of collecting, analyzing, reporting, and using information that can be made available to administrators of hospitals and other medical care institutions. Field assignments. (Fall and spring)

209 **Health Resources Management** (3) Devolites
(Formerly Health Care Economics and Financial Management)
Lecture (2 hours), laboratory (2 hours). Introduction to resources analysis and financial management in health care institutions. Estimation of health services demand and resources requirements. Review and analysis of health services operations; reimbursement by the government and other third parties; medical materials and facilities management; sources of funds. (Fall and spring)

210 **Advanced Health Resources Management** (3) Devolites, Katz
(Formerly Advanced Financial Management of Health Care Institutions)
Development of financial health policies, objectives, and programs. Application of PPBS in the health care field; financial management of multi-unit health care systems; financial aspects of national health programs, prospective rates and regulation of health prices; case studies and field research. (Fall or spring)

212 **Introduction to Health Planning** (3) Reeves, Bergwall, McKelvey
(Formerly Health Project Planning)
Lecture (2 hours), laboratory (2 hours). Introduction to the history and development of health planning in the United States. Presentation of basic health planning methods and procedures at a project level.

213 **Comparative Health Care Systems** (3) Gintzig
(Formerly Administration of Health Care Systems)
International comparative evaluations of various organizational patterns, functions, and trends in health care systems. Emphasis on the sources of such differences and significance of the systems to the health care of a nation. (Fall or spring)

214 **Health Systems Planning** (3) Reeves, Bergwall

Advanced planning techniques emphasizing quantative and rational methodology at the health systems level. In-depth discussion of selected critical components of the health planning process. Prerequisite: HCA 212, or permission of instructor. (Fall or spring)

216 **Seminar: Policy in Health Planning** (3) Reeves, Bergwall

(Formerly Seminar: Health Systems Planning)

Analysis of the legal, political, social, and economic factors in health care planning with emphasis on policy formulation and implementation. Explores the role of societal values in setting health policy. Prerequisite: HCA 212, or permission of instructor. (Fall or spring)

250 **Delivery of Mental Health Services** (3) Morris

Study of the organizations and systems for the delivery of mental health services; emphasis on administration, management, and financial support of treatment and rehabilitation facilities. (Fall)

260 **Introduction to Long-term Care Administration** (3) Wertlieb

(Formerly Seminar: Administration for Long-term Care)

Evolution of long-term institutions as a health care delivery sub-system. Comparative evaluation of characteristics of various long-term care institutions; regulation by government. Relationships between the purposes and functions of these institutions and the health care needs of the community are investigated. (Fall)

261 **Seminar: Managing the Long-term Care Institution** (3) Wertlieb

(Formerly Seminar: Administration for Long-term Care Institutions)

Designed to improve the abilities and effectiveness of health care administrators through a foundation of knowledge and skills in long-term health care facility organization and management. Emphasis on the range of services available in long-term care institutions. Prerequisite: HCA 260, or permission of instructor. (Spring)

265 **Readings in Long-term Care Administration** (3) Staff

Advanced studies in selected aspects of administration of long-term care facilities. May be repeated for credit. (Fall or spring)

267 **Social Gerontology for the Administrator** (3) Duncker

Overview of the social, psychological, and biomedical characteristics of older persons. General as well as special circumstances of the elderly with which administrators of health care facilities should be acquainted. (Fall and spring)

270 **Research in Health Care Administration** (3) Gintzig, Darr

Field research. Primarily for doctoral students; open to other graduate students with consent of instructor. May be repeated for credit. (Fall or spring)

285–86 **Readings in Health Care Administration** (3–3) Staff

Supervised readings in special areas or subdivisions of health care administration and planning. Primarily for doctoral students; open to other students by arrangement. May be repeated for credit. (Academic year)

287 **Seminar: Health Care Administration and the Law** (3) Hirsh, Darr
(Formerly Seminar: Integration of Health Care Administration)
Primarily for doctoral students; open to other students by arrangement. Analysis of the law and health care administration. Legal duties and responsibilities, as well as rights of administrators and the health care facility, are outlined. Discussion of the legal relationships of facility personnel, legal aspects of labor relations, and trends in hospital law. (Fall or spring)

288 **Seminar: Field Problem Studies in Health Care Administration** (3) Bergwall, Gintzig
Selected administrative and planning issues and problems arising in health care facility situations. Primarily for doctoral students; open to other students by arrangement. May be repeated for credit. (Fall or spring)

293–94
–95 **Residency I** (3–3–3) Staff
Twelve-month residency, beginning summer, fall, or spring. Work experience under a qualified preceptor, periodic written progress reports, a written major report, or a selected field project.

296–97
–98 **Residency II** (3–3–3) Gintzig
For selected students who take a second twelve-month residency; begins summer, fall, or spring.

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to doctoral students preparing for the general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to doctoral candidates. May be repeated for credit. (Fall and spring)

Hebrew

See "Classics."

History

Professors R.H. Davison, R.B. Thompson (*Chairman*), F.H. Michael, R.C. Haskett, R.P. Sharkey, H.M. Sachar, R.W. Kenny, Fernando Belaunde-Terry (*Visiting*), P.P. Hill, Letitia Brown, R.C. Thornton

Adjunct Professor R.P. Multhauf
Associate Professors C.J. Herber, W.R. Johnson, Lois Schwoerer, Linda DePauw, R.A. Hadley, P.F. Klarén
Associate Professorial Lecturer Anna Nelson
Assistant Professors A.D. Andrews II, S.A. Grant, R.E. Kennedy, Jr., L.P. Ribuffo

Bachelor of Arts with a major in History (Field-of-Study or Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Humanities and the Natural and Mathematical Sciences.)

2. Required introductory courses—Hist 39–40, 71–72, or equivalent. Majors may waive one or more of the prerequisite courses by passing departmental examinations, by attaining scores of 600 or above on the College Entrance Examination Board Achievement tests, or by good performance on Advanced Placement Examinations. Credit for one or more of the prerequisite courses may be received by superior performance on departmental or Advanced Placement Examinations.

3. Required courses in related areas—(a) either 12 semester hours of an approved foreign language or (b) 9 semester hours in statistics (Stat 53, 97, 113).

4. (a) *Field-of-study major*—Hist 199 (Proseminar), 6 semester hours of third-group courses, including at least 3 semester hours of research seminar, and the passing of the major examination in the senior year. In planning a program, the student, under the guidance of an adviser, should choose courses which will give him a broad understanding of diverse chronological and geographical aspects of the human experience.

(b) *Departmental major*—27 or more hours of second- and third-group courses, including Hist 199, 6 semester hours of third-group courses including at least one research seminar, and 6 semester hours chosen from each of the following fields: I (Europe)—Hist 105, 106, 109, 110, 111, 112, 113, 121, 122, 123, 124, 131, 132, 139, 140, 141, 142, 147, 149, 150, 151, 152, 153, 154, 157, 158, 197, 198; II (United States)—Hist 167, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 184, 185, 186, 197, 198; III (Africa, Asia, and Latin America)—Hist 108, 116, 138, 143, 144, 145, 146, 161, 163, 164, 165, 166, 187, 188, 189, 197, 198.

A pamphlet relating to the major is available in the offices of the Dean of the Columbian College of Arts and Sciences and in the Department of History.

An Honors Program may be chosen by juniors with satisfactory scholastic records. Application to this program must be made before the beginning of the second semester of the junior year. Students accepted into the program take a 3-hour seminar in the second semester of the junior year and complete the research requirements for the history major by preparing the Senior Honors Thesis (Hist 191–92) in the final year of undergraduate study.

Master of Arts in the field of Classical Archaeology, Classics, and History (an interdepartmental degree program offered by the departments of Art, Classics, and History).—Prerequisite: a Bachelor's degree with a background in Classical Archaeology and either Greek or Latin. Applicants from other institutions must present scores on the Graduate Record Examination to the Office of the Graduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. The program of study consists of 24 semester hours of course work (as many as possible should be third-group courses) selected in consultation with the appropriate adviser from the departments of Art, Classics, and History; plus a thesis (equivalent to 6 additional semester hours). Candidates must pass a reading knowledge examination in French or Ger-

man. All candidates are required to pass a general Master's Comprehensive Examination.

Master of Arts in the field of History.—Prerequisite: a Bachelor's degree from an accredited college or university with a major in history, or an equivalent degree; high scholastic standing; and approval of the Department. Applicants from other institutions must present scores on the Graduate Record Examination with the Advanced Test in History and arrange for four persons, preferably former instructors, to send letters or reference forms to the Office of the Gaduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. Candidates must complete either (1) a minimum of 30 semester hours of second- and third-group courses, including Hist 299–300 *Thesis Research*, or (2) a minimum of 36 semester hours of second- and third-group courses, including at least two research seminars (6 semester hours). At least 6 semester hours of each candidate's program must be in third- or fourth-group History courses; a maximum of 6 may be in approved courses outside the Department of History. Master's candidates are responsible for arranging with instructors of second-group courses for extra work, in order to receive graduate credit for such courses. Each student works in two fields of history and is required to pass a Comprehensive Examination in each.

Doctor of Philosophy in the field of History.—Required: the general requirements pages 93–97, 100–102, including the passing of a written examination in two appropriate foreign languages, or one foreign language and an approved tool subject, and the satisfactory completion of the General Examination in four fields. Normally, each doctoral candidate will work in one major (or general) field of study and three special fields. The major fields include the following: Ancient History, Medieval Europe, Early Modern Europe, Modern Europe, United States, Latin America, Modern Near East, Modern Far East, Russia and East Europe. Special fields may vary from the topical (e.g., U.S. Social History, European Intellectual History, etc.) to the chronologically limited fields (e.g., American Colonial History, Tudor and Stuart England, etc.). A student may elect one special field outside of the Department of History if it is relevant to his program.

Bachelor of Arts in Education with a teaching field in History.—Prerequisite: the Education curriculum, page 79.

Required: the History option and the professional courses on pages 116–17, 120–21.

Doctor of Philosophy fields of study in International Relations combine work in Economics, History, and Political Science.

Departmental Prerequisite: Students are expected to bring to second-group courses an appropriate level of background preparation. Ordinarily, this is achieved by successful completion of first-group courses in the same area or by presenting evidence of equivalent preparation. Students lacking such preparation may take second-group courses only with the consent of the instructor.

FIRST GROUP

39–40 **European Civilization in Its World Context** (3–3) Staff

Hist 39: political, social, economic, and cultural history to early modern era. Hist 40: from early modern era to present. (Academic year)

71–72 **Introduction to American History** (3–3) Staff

Hist 71: political, social, economic, and cultural forces of the United States in their world setting from 1620 to 1876. Hist 72: from 1876 to present. (Academic year)

SECOND GROUP

101 **World Civilizations** (3) Thompson
(Formerly History of Culture [3])
The major civilizations of the world examined in the light of attempts by Hegel, Spengler, and Toynbee to discover a pattern in history. (Fall)

102 **History of Revolution** (3) Thompson
The major revolutions of the modern world and the growth of the revolutionary idea under Cromwell, Robespierre, Marx, Lenin, and Mao.

105–6 **History of Science and Technology** (3–3) Multhauf
(Formerly History of Science)
Hist 105: from ancient natural philosophy through the 17th century scientific revolution. Hist 106: from the Industrial Revolution to the 20th century amalgamation of science and technology. In alternate years emphasizes science and technology. (Academic year)

108 **The Ancient Near East and Egypt to 322 B.C.** (3) Hadley
Survey of Egyptian, Mesopotamian, Anatolian, West Semitic, and Iranian civilizations from the Neolithic period to Alexander's conquest.

109 **Early Aegean and Greek Civilizations to 338 B.C.** (3) Hadley
Neolithic background: Bronze age—Minoan, Helladic, and Mycenaean civilizations; classical Greek civilization to the Macedonian conquest. (Fall)

110 **The Roman World to 337 A.D.** (3) Hadley
Prehistoric Italy; rise and decline of the Roman Empire and Latin civilization; cultural, social, and political developments in the Greek world under Roman rule. (Spring)

111–12 **Medieval History** (3–3) Andrews
Development of the Latin Christian community. Hist 111: 4th to 11th century. Hist 112: 11th to 13th century. (Academic year)

113 **Early Middle Ages** (3) Andrews
Mediterranean region from 4th to 11th century; emphasis on Byzantium

116 **History of Africa** (3)
Survey of political, cultural, and economic development from ancient times to the present.

121 **The Renaissance in Western Europe** (3) Schwoerer
The Renaissance City, concepts of the ideal man and woman, the discovery of new worlds, Machiavelli, historiography of the period.

122 **The Reformation in Western Europe** (3) Herber
Religious, political, and social consequences of the theological upheavals of the 16th century. (Spring)

123–24 **European Intellectual History** (3–3) Kennedy
Philosophy, political and economic thought, cultural developments, popular

culture, diffusion of ideas. Hist 123: 17th and 18th centuries. Hist 124: 19th and 20th centuries.

*127 **Theories of History** (3) Lavine

Major philosophies of history: Judeo-Christian, idea of progress, historicism, Hegelian-Marxist dialectic, cyclical (Vico, Spengler, Toynbee), and social-scientific (Kant, Weber) views. Contemporary problems of historical knowledge. (Fall)

131–32 **History of Germany** (3–3) Herber

Political, social, and cultural development. Hist 131: from mid-17th century to Bismarck. Hist 132: from William II to present.

138 **History of World Communism** (3) Thornton

The international communist movement from its beginnings to the present. (Spring)

139–40 **World History in the 20th Century** (3–3) Sachar

Diplomatic, political, and cultural factors. Hist 139: from the turn of the century to the Munich settlement of 1938. Hist 140: from the Munich settlement to present. (Academic year)

141–42 **History of France** (3–3) Kennedy

Political, social, and cultural development. Hist 141: from Henri IV to Napoleon. Hist 142: from Napoleon to present. (Not offered 1975–76)

143 **Europe East of the Elbe, 1815–1939** (3)

Poland, the Danube countries, and the Balkans in the 19th and 20th centuries. (Fall)

144 **Medieval Russia** (3) Grant

(Formerly History of Russia: Medieval to 1700)

Russian history from its beginnings to the reign of Peter the Great. (Fall)

145 **Imperial Russia** (3) Thompson

(Formerly History of Russia: 18th and 19th Centuries)

From the reign of Peter the Great to the Russian Revolution. (Fall)

146 **Soviet Russia** (3) Thompson

The Russian Revolution and Soviet rule to the present. (Spring)

†147 **Economic History of Europe** (3) Sharkey

Economic development since the Middle Ages; emphasis on the period following the Industrial Revolution. Evolution of capitalism and its impact upon the societies of Europe. (Spring)

149–50 **European Diplomatic History** (3–3) Davison

Emphasis on policies and actions of the great powers and their statesmen. Hist 149: 1812 to 1890. Hist 150: since 1890. Students who receive

* An interdepartmental course offered by the departments of History and Philosophy.
† An interdepartmental course offered by the departments of History and Economics.

credit for Hist 150 cannot receive credit for Hist 157. (Academic year)

151–52 **History of England** (3–3) Kenny

(Formerly History of England and Great Britain)
Development of English civilization and its impact on Western culture. Hist 151: to 1689. Hist 152: since 1689. (Academic year)

153 **Tudor England** (3) Kenny

Aspects of the constitutional, social, intellectual, economic, and religious development of England, 1485–1603.

154 **Stuart England** (3) Schwoerer

Grand Rebellion, Restoration, and Glorious Revolution. The political, religious, intellectual, social, and economic development of England, 1603–1714. (Spring)

157 **20th Century European Diplomatic History** (3) Sachar

The main currents, with necessary 19th century background. Students who receive credit for Hist 157 cannot receive credit for Hist 150. (Fall)

158 **Modern Jewish History** (3) Sachar

A secular history of the Jewish people from the 18th century to the present state of Israel; emphasis on European political, economic, and cultural influences. (Spring)

161 **Revolution in 20th Century Latin America: the Mexican and Cuban Experience** (3) Klarén

Social, economic, and political forces working to undermine the traditional fabric of Latin American society; emphasis on historical roots of revolutionary movements. (Spring)

163–64 **History of Latin America** (3–3) Klarén

Political, socioeconomic, and cultural development. Hist 163: colonial period. Hist 164: national period. (Academic year)

165 **History of Brazil** (3) Klarén

Political, socioeconomic, and cultural aspects from pre-Columbian times to the present.

166 **History of Mexico** (3) Klarén

Political, socioeconomic, and cultural aspects from pre-Columbian times to the present. (Fall)

167 **Man-made America: the Colonial Scene** (3) Haskett

(Formerly American Colonial History)
The setting and shape of life in early America. (Spring)

169 **The American Revolution** (3) DePauw

The political, intellectual, social, military, and economic significance of the events leading to the War for American Independence and the adoption of the Federal Constitution. (Fall)

170 **U.S. Early National History** (3) Hill

Political, diplomatic, economic, and social history of the early republic, 1789–1828. (Fall)

171–72 **U.S. Social History** (3–3) Brown

Hist 171: daily life, institutions, intellectual and artistic achievements of the Agrarian Era, 1607–1861. Hist 172: the Urban-Industrial Era from 1861 to present.

173–74 **Afro-American History** (3–3) Brown

The place of Black Americans in the corpus of American history. (Academic year)

175–76 **U.S. Political History** (3–3) Haskett

Hist 175: to the Civil War. Hist 176: Civil War to 1960. (Academic year)

177 **The Ante-bellum South** (3) DePauw

Political, economic, intellectual, social, and cultural characteristics of the American South before the Civil War. (Spring)

178 **Recent U.S. History** (3) Ribuffo

Political, social, and intellectual history from 1890 to the present. (Fall)

*179–80 **U.S. Economic History** (3–3) Sharkey

Process of economic growth from Colonial times to the present. Development of various sectors in the economy and their interdependence. Hist 179: 1607–1865. Hist 180: from 1865 to present. (Academic year)

181–82 **U.S. Diplomatic History** (3–3) Hill

Survey of American foreign relations from the era of the American Revolution. Hist 181: to 1898. Hist 182: 20th century. (Academic year)

185 **Women in America** (3) Staff

Survey of the political, economic, social, military, religious, intellectual, and cultural activities of women in America from 1000 A.D. to the present. (Spring)

186 **U.S. Urban History** (3) (Same as AmCv 186) Gillette

Development and characteristics of American cities. (Fall)

187 **History of Modern China** (3) Johnson

China since 1840, particular attention to political developments. (Fall)

188 **History of Chinese Communism** (3) Thornton

Survey of the leadership, ideology, structure, and operation of the Chinese revolutionary movement from its founding to the present. (Fall)

189 **History of Modern Japan** (3) Sigur

Japan's century of modernization—from the Meiji Restoration of 1868

* An interdepartmental course offered by the departments of History and Economics.

to the present. Emphasis on historical, political, economic, and cultural factors. (Fall)

191–92 **Senior Honors Thesis** (3–3) Staff
Required of and open only to undergraduate honors candidates in history. (Academic year)

193 **History of the Near East** (3) Davison
Byzantine, Arab, Persian, and Islamic backgrounds; rise and decline of the Ottoman Empire; action of European powers in the area; Ottoman breakup into the Turkish Republic and other states. (Fall)

194 **History of the Modern Near East** (3) Davison
Beginning with Napoleon's invasion of Egypt. Development of nationalism and of modern states; impact of the West on culture and institutions; great-power imperialism; crises of Turkish Straits, Suez, Arab-Israeli relations, and other issues. (Fall 1976 and alternate falls)

195–96 **History of East Asia** (3–3) Johnson
Civilizations of China and Japan; emphasis on institutional development. Hist 195: beginnings to about 1800. Hist 196: from eve of the modern era to present. (Academic year)

197 **Oral History and Interview Techniques** (4) Staff
Introduction to theory and practice of obtaining and using historical data through recorded interviews. Examination of major published works in oral history. Particular attention to ongoing oral history projects in the Washington area.

198 **Special Topics in History** (3) Staff
Historical perspectives on great issues of past and present. New topic each semester.

199 **Proseminar: Readings for the History Major** (3) Staff
Required of senior history majors. Readings and discussions on major trends in history; representative selections from the classics of historical literature. Students who receive credit for Hist 199 cannot receive credit for Hist 201. (Fall and spring)

THIRD GROUP

Prerequisite to all third-group History courses: the appropriate second-group preparation and consent of instructor.

201 **History and Historians** (3) Staff
Students who receive credit for Hist 201 cannot receive credit for Hist 199. (Fall and spring)

203–4 **Research Seminar** (3–3) Staff
Prerequisite: approval of Department. (Academic year)

205 **Evolution of Nationalism in Eastern Europe** (3) Petrov
(Formerly Seminar: Modern History of Eastern Europe)
Formation of national consciousness and emergence of modern East Euro-

pean states after World War I. Developments of the interwar period. Open to qualified undergraduate seniors. (Fall)

206 **Revolution in Eastern Europe** (3) Petrov
(Formerly Seminar: Modern History of Eastern Europe)
Transformations of East European states during World War II. Resistance movements, communization, and national self-assertion in the immediate post-Stalin period. Open to qualified undergraduate seniors. (Spring)

207 **Seminar: the Communist Party of the Soviet Union** (3) Grant
Evolution of the Communist movement in Russia. Party origins, growth, and organization; intra- and inter-party strife. (Spring)

208 **Research Seminar: History of World Communism** (3) Thornton
Prerequisite: Hist 138 or equivalent.

209–10 **Seminar: Ancient History** (3–3) Hadley
Prerequisite: Hist 108, 109, or 110; or equivalent. (Academic year)

211–12 **Seminar: Medieval History** (3–3) Andrews
Prerequisite: Hist 111–12 or equivalent. Students with working knowledge of Latin may receive Research Seminar credit. (Academic year)

214 **Transformation of the Socialist Commonwealth** (3) Petrov
(Formerly Evolution of the Socialist Commonwealth)
Soviet relations with East European and Asian socialist states from the end of World War II to the Sino-Soviet split. Changes in substance and form in relations among ruling Communist parties. Open to qualified undergraduate seniors. (Summer)

217–18 **Seminar: Russian and Soviet Thought** (3–3) Grant
Prerequisite: Hist 145 or 146, or equivalent. (Academic year)

*225 **History of Washington, D.C.** (3) Brown

†231 **Seminar: Sino-Soviet Relations** (3) Michael
Background, development, and status of conflict within the communist movement; emphasis on the role of Chinese communists. Prerequisite: 3 semester hours selected from Hist 187; P Sc 101, 194; or equivalent. (Spring)

237 **Seminar: Soviet Foreign Policy, 1917–1960** (3) Petrov
Concepts and perceptions guiding Soviet relations with the outside world. From the blockade and intervention, through years of isolation, World War II, the Cold War, to "peaceful co-existence" and detente. Open to qualified undergraduate seniors. (Fall and summer)

241–42 **Research Seminar: Modern European History** (3–3) Herber, Kennedy
Prerequisite: appropriate preparation and consent of instructor.

* Offered jointly by the Department of History and the American Studies Program.
† An interdepartmental course offered by the departments of History and Political Science.

245 **Research Seminar: Revolutionary History** (3) Thompson
Prerequisite: Hist 102 or consent of instructor. (Spring)

246 **Research Seminar: Russian History** (3) Thompson
Prerequisite: Hist 145, 146, or consent of instructor. (Fall)

247 **Research Seminar: the Theory and Practice of Modern Imperialism** (3) Sharkey
(Fall)

248 **Reading Seminar: Modern European and Near Eastern History** (3)
Admission by permission of instructor.

249–50 **Research Seminar: European Diplomatic History** (3–3) Davison
Prerequisite: one course chosen from Hist 149, 150, 193, 194; or equivalent. Reading knowledge of one modern language other than English, preferably French, German, Russian, or Italian.

251–52 **Research Seminar: English History** (3–3) Kenny, Schwoerer
Prerequisite: Hist 151–52 or equivalent. (Academic year)

261–62 **Research Seminar: Latin American History** (3–3) Klarén
Prerequisite: 6 semester hours of undergraduate course work in Latin American History. (Academic year)

271–72 **Research Seminar: U.S. Social History** (3–3)
Prerequisite: Hist 171–72 or equivalent.

*273–74 **Research Seminar: Materials in Afro-American Culture** (3–3) Brown
Prerequisite: Hist 173–74 or equivalent. (Academic year 1976-77 and alternate years)

275–76 **Research Seminar: U.S. Political History** (3–3) Haskell
Prerequisite: Hist 175-76 or equivalent. (Academic year)

278 **Research Seminar: American History** (3)
Admission by permission of instructor. Hill

281–82 **Research Seminar: U.S. Diplomatic History** (3–3)
Prerequisite: Hist 181–82 or equivalent. (Academic year) Hill

283–84 **Research Seminar: Recent U.S. History** (3–3)
Prerequisite: 6 semester hours of 100-level American History courses. (Hist 283—fall) Hill

285–86 **Research Seminar: Early National History, 1789-1828** (3–3)
(Formerly Seminar: Early American History, 1607–1828)
Prerequisite: Hist 170, 175, or 181; or equivalent. Staff

287 **Seminar: Problems in Latin American Civilization** (3)
Interdisciplinary seminar partially guided by a specialist within the

* Offered jointly by the Department of History and the American Studies Program.

methodology of his chosen discipline; each student writes a report on some aspect of a selected key theme. Admission by permission of instructor. (Spring)

288 **Research Seminar: History of Chinese Communism** (3) Thornton
Prerequisite: Hist 188 or equivalent. (Spring)

289 **Seminar: Modern Japanese History** (3) Sigur
Research and writing seminar on selected topics in modern Japanese history from the Meiji Restoration of 1868 to the present. (Spring)

291 **Research Seminar: 20th Century History** (3) Sachar
(Fall)

292 **Research Seminar: the Palestine Question in Modern History** (3) Sachar
(Spring)

293–94 **Research Seminar: the Modern Near East** (3–3) Davison
Prerequisite: Hist 193 or 194 or equivalent background. (Hist 294—spring)

295–96 **Research Seminar: the Modern Far East** (3–3) Johnson
Prerequisite: Hist 195–96 or equivalent.

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

Prerequisite to all fourth-group History courses: the appropriate second-group preparation and consent of instructor.

Fourth-group History courses are limited to graduate students; but they are primarily for doctoral students.

George Washington University is a member of the Folger Institute of Renaissance and 18th-century Studies. The policies of the Institute are set by a central committee on which each member institution is represented. Doctoral students enrolled in one of the Institute seminars are eligible to apply for fellowship aid, under a grant from the National Endowment for the Humanities. Folger Institute Seminars are numbered 301 through 309. Seminar titles for the 1975–76 academic year are listed below. Students wishing to register for these courses should consult the Chairman of the Department of History.

301 **Origins of the Scientific Revolution** (3) Staff
(Fall)

302 **Restoration and 18th-Century Drama** (3) Highfill and Staff
(Spring)

304 **The Revolution of 1689** (3) Schwoerer
(Spring)

305 **English Renaissance Palaeography** (3) Staff
(Fall)

306 **Shakespeare and the Scholarly Tradition** (3) — Staff
(Spring)

307 **Petrarchism and Stoicism in the Renaissance** (3) — Staff
(Fall)

308 **Milton in the Context of 17th-Century English Politics** (3) — Staff
(Spring)

309 **Dante: A Reading of The Divine Comedy** (3) — Staff
(Fall)

311–12 **Readings in Medieval History** (3–3) — Andrews
(Hist 312—spring)

341–42 **Readings in Modern European History** (3–3) — Davison
(Hist 342—spring)

345–46 **Readings in Russian History** (3–3) — Thompson

351–52 **Readings in English History** (3–3) — Schwoerer, Kenny

361–62 **Readings in Latin American History** (3–3) — Klarén

371–72 **Readings in American Social History** (3–3) — Brown

*373–74 **Readings on the Negro in American Culture** (3–3) — Brown
(Academic year 1975–76 and alternate years)

375–76 **Readings in U.S. Political History** (3–3) — Haskett
(Hist 376—fall)

†379–80 **Readings in Economic History** (3–3) — Sharkey
Hist 379: American economic history. Hist 380: modern European economic history. (Academic year)

381–82 **Readings in American Diplomatic History** (3–3) — Staff
(Hist 382—fall)

385 **Readings in History of Women in America** (3) — DePauw
(Formerly Readings in Early U.S. History)
(Spring)

386 **Readings in Early U.S. History** (3) — DePauw
(Fall)

387–88 **Readings in the History of Sino-Soviet Relations** (3–3) — Thornton
(Hist 388—fall)

395–96 **Readings in Modern Far Eastern History** (3–3) — Johnson

* Offered jointly by the Department of History and the American Studies Program
† An interdepartmental course offered by the departments of History and Economics.

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Honors Program—Columbian College

H.E. Yeide, Jr., *Coordinator*

Limited to selected sophomores (see page 73).

FIRST GROUP

1 **Seminar: the Great Ideas of the West** (3)

Reading, discussion, and research involving works crucial to an understanding of the great Western ideas—their historical development and contemporary relevance. Examination of problems and categories that lie at the roots of most modern scholarly disciplines. (Fall)

21–22 **Seminar: Contemporary Problems** (3–3)

Reading, discussion, and research dealing with one major contemporary problem each semester, utilizing the perspectives and insights of various academic disciplines. (Academic year)

23 **Independent Honors Study** (3)

Admission by prior approval of Honors Program Advisory Committee. A major study project supervised by a faculty member. A significant paper or report required. (Spring)

Human Ecology—Doctoral Study

The Graduate School of Arts and Sciences offers an interdisciplinary program leading to the degree of Doctor of Philosophy in the field of Human Ecology. This program is directed by a committee whose members are drawn from several departments in the Graduate School.

See pages 93–97, 100–102 for general requirements.

Human Kinetics and Leisure Studies

Professors R.G. Hanken, Loretta Stallings, J.L. Breen (*Chairman*), Donald Hawkins (*Research*)

Professorial Lecturers Margie Hanson, Edith Ball, Dolores Geddes

Associate Professors Lyndale George, Jeanne Snodgrass, Maida Withers, Sharon Leigh Clark, A. LaVerne Dickerson (*Research*)

Adjunct Associate Professor D.C. Paup
Associate Professorial Lecturers Mike Millan, P.J. Verhoven, J.W. Eberhard
Assistant Professors Honey W. Nashman, Nancy Johnson, R.E. Cipriano (*Research*)
Assistant Professorial Lecturers Barbara Katz, S.Y. Cha, W.A. Hillman, Jr., Lawrence Houstoun, Jr., Dorothy Duncan
Lecturers Calva Collier, Elisabeth Burkhardt, Margaret Sinclair, Margaret Ramsay, Ann Lohn, JoAnne Sellars, Sally Crowell

Programs of study leading to the degrees of *Bachelor of Science in Human Kinetics and Leisure Studies* (opportunity for specialization in elementary and secondary school physical education or dance), *Master of Arts in Education* (field in Human Kinetics and Leisure Studies with specialization in adaptive physical education, dance, movement studies of children, secondary school physical education, therapeutic recreation, tourism, or urban recreation and parks) are offered by the School of Education (see pages 105–27).

This Department includes all the recognized sport and dance activities of University students except intercollegiate athletics for men.

From 3 to 4 semester hours of first-group Human Kinetics and Leisure Studies courses are required for Bachelor's degree candidates in the education and physical education curriculum in Columbian College of Arts and Sciences.

The University is not responsible for injuries received in intramural games or in any of the activities of the Department of Human Kinetics and Leisure Studies, and the student assumes full responsibility therefor.

FIRST GROUP

Courses numbered from 1 to 49 are beginning activities courses and require a minimum of 24 clock hours of instruction.

Courses numbered from 50 to 100 are for students who wish in-depth training in a particular activity. They require a minimum of 48 clock hours of instruction.

A physical education activities fee of $4.50 a semester is required for registration in one or more of the activity courses (numbered 1 to 100).

Students whose medical examinations indicate the desirability for remedial or restricted activity are assigned to programs especially adapted to their needs.

Unless otherwise indicated, all first-group courses are offered both in the fall and spring semester.

All first-group courses may be repeated with permission of the instructor.

10 **Beginning Badminton** (1) Breen

11 **Beginning Bowling** (1) Staff

12 **Introduction to Ballet** (1) (Spring only) Staff

13 **Beginning Ballet Technique** (1) Sinclair

14 **Intermediate Ballet Technique** (1) Sinclair

15 **Intermediate/Advanced Ballet Technique** (1) Sinclair

16 **Introduction to Modern Dance** (1) (Fall only) Staff

17 **Beginning Modern Dance Technique** (1) Staff

18 **Intermediate Modern Dance Technique** (1) — Staff

19 **Ethnic Dance** (1) — Johnson

20 **Beginning/Intermediate Golf** (1) — Staff

21 **Foil Fencing** (1) — Snodgrass

22 **Basketball** (1) — Hanken

23 **Touch Football** (1) (Fall only) — Hanken

24 **Volleyball** (1) — Hanken

25 **Softball** (1) (Spring only) — George

26 **Karate (Korean Style)** (1) — Cha

27 **Beginning Tennis** (1) — George

28 **Intermediate Karate (Korean Style)** (1) — Cha

29 **Yoga** (1) — Burkhardt

30 **Ski Conditioning** (1) — Snodgrass

31 **Backpacking** (1) — Staff

32 **Beginning Swimming** (1) — Staff

33 **Swimming/Life Saving** (1) — Staff

34 **Synchronized Swimming** (1) — Staff

35 **Slimnastics and Weight Training** (1) — Staff

39 **Handball** (1) — Staff

40 **Squash** (1) — Staff

50 **League Bowling** (1 or 2) — Staff
Emphasis on competitive bowling as a lifetime sport.

51 **Gymnastics** (2) — Staff
Emphasis on apparatus and trampoline.

52 **Intermediate/Advanced Modern Dance Technique** (2) — Staff
Admission by permission of instructor.

53 **Advanced Modern Dance Technique** (2) — Staff

54 **Intermediate/Advanced Tennis** (2) — George
Development of skills, theories of strategy; emphasis on competitive play as a lifetime sport.

55 **Swimming—Water Safety Instruction** (2) — Staff

56 **Scuba Diving** (2) Staff

57 **Intermediate/Advanced Badminton** (2) (Spring only) Breen

SECOND GROUP

101 **Physical Education in the Elementary School** (3) Snodgrass
For Elementary Education and Physical Education majors. Child growth and development related to school and playground programs in movement. Philosophy, curriculum, techniques of teaching, and equipment evaluation. (Fall)

102 **Movement Education** (3) Snodgrass
Techniques of teaching movement education with emphasis on problem-solving methods for kindergarten and grades 1–6. Prerequisite: HKLS 101 or permission of instructor. (Spring)

103 **Professional Foundations and Concepts of Human Kinetics and Leisure Studies** (3) Breen
Orientation to professional competencies; basic philosophy as it relates to the school, recreation associations, and professional associations.

105 **Introduction to Adaptive Physical Education and Therapeutic Recreation** (3) Cipriano
Philosophy, methods, and concepts relating to recreation and adaptive physical education for the ill, aged, and disabled. Concepts in program planning, leadership, and adaptations of activities to special groups. Includes field visitation and analysis of activities. (Fall)

106 **Introduction to Dance Therapy** (3) Lohn, Samuels
General survey of dance therapy areas from theoretical and experimental points of view. Exploration of professional opportunities.

107 **Teaching Ethnic Dance** (3) Johnson
Methods and materials for teaching the folk and social forms of dance. (Spring)

108 **Dance Improvisation** (3) Withers
Awareness of body movements, environment, group dynamics, performance, and composition through improvisational technique. (Fall and spring)

109–10 **Dance Composition** (3–3) Withers
HKLS 109: basic elements and principles of composition. HKLS 110: advanced problems in composition. (Academic year)

111–12 **Sports Education Technique** (3–3) Staff
Techniques for teaching individual, dual, and team sports. (Academic year)

113–14 **Field Experience: Practicum in Physical Education, Dance, or Recreation** (3–3) Staff
Pre-practice teaching or leadership in elementary or secondary schools

physical education; adaptive physical education, dance, or recreation settings. Seminars relating to field experiences. (Academic year)

116 **Mime Movement Theatre** (1) Ramsay
Psychological improvisation, improvisation with masks, Commedia dell'Arte, Pantomime Blanche, chorus work, clown work.

117 **Dance Education** (3) Johnson
(Formerly Techniques of Teaching Dance)
Organizational, administrative, philosophical, and conceptual approaches to the teaching of dance in academic and nonacademic settings. (Fall)

118 **Special Problems in Dance Composition** (1) Staff
Work with elements of movement leading to short composition studies.

119 **Creative Dance for Children** (3) Withers
Dance is an expressive art medium for children; emphasis on concepts and principles, methods and materials. Consideration given to dance for children with special education problems. (Spring)

120 **Repertory** (1 or 2) Staff
Study and performance of dance works. Admission by permission of instructor. May be repeated for credit not to exceed 4 semester hours. (Fall and spring)

121 **Dance Technique I** (1) Sellars
Intermediate/advanced modern dance. May be repeated for credit. (Fall and spring)

122 **Methods and Materials for Health Education** (3) Duncan
Conceptual approach to curriculum design and teaching, including planning and organization, methodology, selection and use of materials, and evaluation; basic health knowledge. (Fall and spring)

123 **Dance Technique II** (1 or 2) Withers
Advanced modern dance. May be repeated for credit not to exceed 4 semester hours. (Fall and spring)

124 **Movement Technique** (1) Staff
Analysis of movement, dramatic justification of movement; mime technique; respiration and its integration with movement.

129 **Introduction to Motor Learning** (3) Stallings
Concepts of motor skill learning applied to the teaching of movement skills. (Spring)

130 **Motor Performance in Childhood** (3) Snodgrass
Study of the evolvement and refinement of fundamental movement skills. (Spring)

131 **Student Teaching in Elementary and Movement Education** (6 to 12) Snodgrass
Admission by permission of instructor. (Fall and spring)

133 **Student Teaching** (6 to 12) Johnson
Prerequisite: HKLS 113–14 or equivalent. Admission by permission of instructor. (Fall and spring)

135–36 **Dance History** (3–3) Johnson
Study of dance from antiquity to present; emphasis on cultural significance of dance as art form, symbolic form, and social behavior. (Academic year)

137 **Dance Notation and Movement Analyses: The Laban System** (3) Katz
(Formerly Dance Notation)
Concepts and applied principles of Laban's theories of movement (or Laban analyses) with emphasis on Labanotation. (Spring)

138 **Physical Education Curriculum and Administration** (3) George
Curriculum and administration in physical education. Professional ethics. (Fall)

139 **Teacher Behavior** (2 or 3) Breen
Teacher behavior analyzed in relation to motives, attitudes, and expectations. Integration of structure, psychological processes, and behavior emphasized for a more thorough understanding of the adjustment processes. (Spring)

141–42 **Theater Production for the Dance** (2–2) Johnson
(Formerly Dance Production)
Theories and practicum in technical aspects of dance production. HKLS 141: lighting and theater management. HKLS 142: costuming, make-up, sets, props, and audio-visual techniques. (Academic year)

144 **Choreography** (2) Withers
Solo and group. May be repeated once for credit. (Fall and spring)

150 **Human Anatomy** (3) Stallings
Systematic study of the structure of the human body; emphasis on kinesiological anatomy, including joints, muscles, and neuromuscular integration. (Fall)

151 **Kinesiology** (3) Paup
Analysis of human movement, including mechanical physics, anatomy, and physiology. Prerequisite: approved course in anatomy. (Spring)

152 **Environment, Leisure, and Quality of Life** (3) Houstoun
Environmental problem-solving through ecological and social planning; concentration on the impact of leisure on man's total physical and cultural development; emphasis on philosophical considerations. (Fall)

156 **Application of Recreational Skills to Urban Living** (3) George
Development of recreational skills; emphasis on local opportunities for recreational activities. Current trends in urban recreational development and program planning. May be repeated for credit with permission of instructor. (Fall and spring)

157 **Dance Technique and Theory** (2) Withers

Theories of movement; analysis and practice of contemporary dance techniques. Individual application. (Fall)

158 **Safety Education** (3) Millan

Liability, prevention, and emergency care of all types of injuries with reference to first aid and athletics. Proper use of personnel, facilities, and equipment. (Fall)

164 **Physiology of Exercise** (3) Paup

The physiological functions of the body and the effect of exercise on these functions. Prerequisite: HKLS 150 or permission of instructor. (Spring)

170 **Problems Seminar** (3) George

Content differs each time course is offered, according to current issues, professional policies, and practices. May be repeated for credit. (Spring)

171 **Current Professional Literature** (2 or 3) Snodgrass

Study of current education literature with implications for physical education and the utilization of retrieval systems. (Fall)

172 **International Experiences** (1 to 6) Staff

Special travel to foreign countries to study programs with implications for professional development.

173 **Independent Study** (1 to 6) Staff

Individually designed model for intensive study in an area of special interest. Prerequisite: demonstrated competency for independent work and permission of adviser and instructor. (Fall and spring)

175 **Dance Accompaniment** (3) Staff

Analysis of music composition and notation. Accompaniment for the dance. Resources in music for dance. Prerequisite: basic knowledge of rhythmic theory. (Spring 1975 and alternate springs)

184 **Workshop in Human Kinetics and Leisure Studies** (1 to 3) Staff

Workshops in human kinetics and leisure studies, dance, and recreation. Current problems, practices, and new approaches. Content of each workshop will depend on current needs. May be repeated for credit with permission of adviser.

THIRD GROUP

201 **Philosophic Foundations of Physical Education** (3) Breen

Concepts of philosophy and research method applied to objectives and practices in physical education. (Spring)

202 **Conceptual Basis of Motor Learning** (3) Stallings

Variables of perceptual motor learning and performance; theories, concepts, and models of learning related to the development of motor skills. (Fall and spring)

205 **Diagnostic-Prescriptive Techniques: Perceptual-Motor Domain** (3) Stallings

Programs of perceptual-motor development and their theoretical assumptions; diagnostic and remediation techniques. (Spring)

211 **Problems and Modern Trends in Physical Education** (3) Breen

Lecture (2 hours), conference (1 hour). For experienced teachers. Organization, supervision, and curriculum problems growing out of current issues; program planning policies; competition.

220 **Problems in Health Education** (3) Staff

Lecture (2 hours), conference (1 hour). Health needs, policies and program planning, use of community resources, promising practices in the field. (Fall)

230 **Movement Analysis** (3) Breen

Scientific analysis of fundamental movement and sports skills. (Fall 1976 and alternate falls)

232 **Current Issues in Elementary School Physical Education** (3) Hanson

Current philosophy, trends, and research; implications for curriculum, instruction, evaluation. (Spring)

234 **Organization and Administration of Elementary School Physical Education** (3) Hanson

For school administrators, supervisors, principals, and physical education specialists. Curriculum, administrative, and supervisory problems; kindergarten, grades 1–6. (Spring)

239 **Urban Recreation for Special Populations** (3) Cipriano

Development of recreation for the disabled, impaired, and handicapped using the Baltimore-Washington areas as the urban problem setting; development of competencies in community organization, communications, consultation, group dynamics, and interpersonal relations; program development and evaluation. (Fall)

240 **Physical Education for the Handicapped** (3) Breen and Staff

Adaptive physical education for handicapped populations; development of competencies in diagnostic/prescriptive teaching, program design and evaluation, consultation, and communications. (Fall)

244 **Therapeutic Recreation Practice** (3) Cipriano

Professional competencies for delivery of services to the handicapped, disabled, impaired; public and private setting for service delivery; client assessment and counseling techniques; basic special education, medical, and rehabilitation terminology; etiology of handicapping conditions as related to recreation. (Spring)

245 **Medical Aspects of Therapeutic Recreation and Adaptive Physical Education** (3) Hawkins, Cipriano

Etiology, symptomology, and treatment of chronic and traumatic disorders associated with handicapping conditions; implications for pro-

gramming, facility development, and related aspects of therapeutic recreation or adaptive physical education. (Spring)

250 **Administration of Leisure and Tourism Services** (3) Verhoven

Planning and organization of a comprehensive system of urban leisure services utilizing educational, cultural, and recreational resources; emphasis on public relations, personnel administration and supervision, systems analysis, fiscal management and managerial accountability. (Spring)

251 **Leisure Counseling** (3) Cipriano

The application of counseling techniques to leisure service in order to provide recreators the ability to help people make choices of leisure experiences. (Spring)

256 **Sports Medicine and Rehabilitation** (3) Staff

Theory and practice of therapeutic exercise and recreation as applied to the rehabilitation of the handicapped; injuries; preventive, adapted, and remedial concepts; research in area of general rehabilitation practice; professional roles as related to ancillary medical focus. (Spring)

260 **Tourism Development** (3) Hawkins

Socioeconomic analysis of demand for travel and tourism resources; techniques for planning and design; examination of current trends. (Spring)

265 **Sports Policy and Political Systems** (3) Breen

Methods of political analysis applied to sports policy; comparative approach to the study of the relationships between ideology, economic development, and the types and levels of government involvement in sports policy. (Spring)

270 **Philosophic Foundations of Dance** (3) Clark

Examination and discussion of problems in dance confronting the artist as well as the audience, in terms of dance as an art form and the creating and experiencing of that form.

271 **Dance Notation and Reconstruction** (3) Katz

(Formerly Dance Notation I)

Recreating the structure and dynamics of movement from Labonotated dance scores; exploration of floor work; some emphases in writing skills leading to elementary or intermediate certification. Prerequisite: HKLS 137. (Fall)

272 **Advanced Notation** (3) Katz

(Formerly Dance Notation II)

Advanced methods of observing, recording, and analyzing movement. Prerequisite: HKLS 271. (Spring)

273 **Advanced Choreography** (3) Clark

Advanced choreographing of group or solo dance work. Course work includes responsibility for auditions, rehearsals, and final work presented in concert. May be repeated once for credit. (Fall or spring)

276 **Dance in Society** (3) Clark

Anthropological aspects of dance; emphasis on current research and literature.

277 **Dance Expressions in Selected Cultures** (3 or 6) Clark

Investigation of traditional dance forms through research and field work. Research usually conducted in the field. (Fall and spring)

280 **Advanced Workshop** (1 to 3) Staff

Workshops in Physical Education, Dance, and Recreation. Emphasis on contemporary issues and problems; development of advanced professional competencies. May be repeated for credit with permission of adviser.

283 **Supervised Experience** (3 to 6) Staff

Field work, internship and/or instructional practice, including conference and/or seminar. May be repeated once for credit with permission of adviser. (Fall and spring)

296 **A Systems Approach to Leisure and Tourism Resource Development** (3) Eberhard

Comprehensive planning, human resource development, and program facility design, using systems approaches. (Fall)

297 **Advanced Topical Studies** (3) Staff

Independent research and study pertinent to the needs of the student. Prerequisite: Educ 295 or permission of instructor. May be repeated once for credit with permission of the adviser. (Fall and spring)

Institute for Sino-Soviet Studies

MEMBERS OF THE INSTITUTE

Gaston J. Sigur (*Director*), C.F. Elliott, S.A. Grant, Andrew Gyorgy, H.C. Hinton, W.R. Johnson, C.A. Linden, F.H. Michael, G.A. Olkhovsky, Vladimir Petrov, Chung-wen Shih, R.B. Thompson, Richard Thornton, R.Y.C. Yin

ASSOCIATE MEMBERS OF THE INSTITUTE

Joseph Baclawski, Eleanor Hadley, Abraham Halpern, John Hardt, Tao-tai Hsia, Bernard Ramundo, Philip True, R.K. White, T.W. Wolfe

---

The Institute for Sino-Soviet Studies offers specialized graduate study in the School of Public and International Affairs. Students who lack background in Soviet and East Asian studies are required to take undergraduate courses selected by the adviser as prerequisite to graduate work. Related preparatory undergraduate courses include the following: Econ 101, 102, 133, 134, 169, 170; Hist 138, 143, 144, 145, 146, 187, 188, 189, 195–96; PSc 5, 101, 112, 115, 160, 162, 163, 193, 194; Psyc 151.

For description of the objectives and programs of the Institute, see pages 179–80. For descriptions of the courses listed below, see the appropriate departmental listing.

ECONOMICS

267 *Seminar: Soviet Economy* (3)	Hardt
268 *Seminar: Economic Theory and Development in Communist Countries* (3)	Hardt
269 *Economy of Communist China I* (3)	Yin
270 *Economy of Communist China II* (3)	Yin
271 *Economy of Japan* (3)	Hadley

GEOGRAPHY AND REGIONAL SCIENCE

265 *Seminar: Geography of the Soviet Union* (3)	Baclawski
266 *Seminar: Geography of China* (3)	True

HISTORY

205 *Evolution of Nationalism in Eastern Europe* (3)	Petrov
206 *Revolution in Eastern Europe* (3)	Petrov
207 *Seminar: the Communist Party of the Soviet Union* (3)	Grant
208 *Research Seminar: History of World Communism* (3)	Thornton
214 *Transformation of the Socialist Commonwealth* (3)	Petrov
217–18 *Seminar: Russian and Soviet Thought* (3–3)	Grant
231 *Seminar: Sino-Soviet Relations* (3)	Michael
237 *Seminar: Soviet Foreign Policy, 1917-1960* (3)	Petrov
245 *Research Seminar: Revolutionary History* (3)	Thompson
246 *Research Seminar: Russian History* (3)	Thompson
288 *Research Seminar: History of Chinese Communism* (3)	Thornton
289 *Seminar: Modern Japanese History* (3)	Sigur
295–96 *Research Seminar: the Modern Far East* (3–3)	Johnson
345–46 *Readings in Russian History* (3–3)	Thompson
387–88 *Readings in the History of Sino-Soviet Relations* (3–3)	Thornton
395–96 *Readings in Modern Far Eastern History* (3–3)	Johnson

***LAW**

546 *Soviet Law* (2)	Ramundo
547 *Chinese Law* (2)	Hsia

POLITICAL SCIENCE

213 *Comparative Communist Systems I* (3)	Staff
214 *Comparative Communist Systems II* (3)	Staff
215–16 *Seminar: the Communist Camp in World Politics* (3–3)	Staff
224 *Readings in Socialism and Communism* (3)	Elliott, Linden
227 *Seminar: Governments and Politics of Eastern Europe* (3)	Gyorgy
229 *Readings in Soviet Government and Politics* (3)	Elliott, Linden
231 *Seminar: Sino-Soviet Relations* (3)	Michael

* Students who elect courses in Law must have the permission of the Dean of the National Law Center. For course descriptions, see the *National Law Center* catalogue.

232	*Seminar: International Communications* (3)	Staff
233	*Seminar: Soviet Government and Politics* (3)	Elliott, Linden
253	*Seminar: Chinese Government and Politics* (3)	Michael
254	*Colloquium: East Asia* (3)	Michael
255	*Colloquium: Russia and Eastern Europe* (3)	Gyorgy
257–58	*Seminar: Communism in Developing Countries* (3–3)	Staff
265–66	*Chinese Communist Policy Processes* (3–3)	Hinton
269	*Seminar: Soviet Foreign Policy* (3)	Elliott
270	*Political and Social Institutions of Eastern Europe* (3)	Gyorgy
274	*Principles and Problems of International Political Communication* (3)	Staff
288	*Seminar: Soviet Military Policy and Strategy* (3)	Wolfe
294	*Seminar: Governments and Politics of Japan and Korea* (3)	Staff
295	*Seminar: Chinese Communist Foreign Policy* (3)	Hinton
296	*The Communist Role in Far Eastern International Politics* (3)	Hinton
298	*Southeast Asia in World Politics* (3)	Staff
325	*Research Seminar: Topics in Marxism-Leninism* (3)	Elliott, Linden

PSYCHOLOGY

259	*Seminar: Social Psychology of Communism* (3)	White

International Relations—Graduate Study

DOCTORAL PROGRAM COMMITTEE IN INTERNATIONAL RELATIONS

B.M. Sapin (*Chairman*), Andrew Gyorgy, F.H. Michael, Benjamin Nimer, Bernard Reich, H.M. Sachar

The Graduate School of Arts and Sciences offers an interdisciplinary program leading to the degree of Doctor of Philosophy in the field of International Relations. (The School of Public and International Affairs offers a Master of Arts degree program in the area of International Affairs.) The program is directed by a committee whose members are drawn from the departments of Economics, Political Science, and History.

Required: the general requirements, pages 93–97, 100–102. Each program must include three disciplines and five fields of study. However, in some cases, cohesive and well-integrated programs based on two disciplines may be approved.

International Affairs

See "Public and International Affairs."

Italian

See "Romance Languages and Literatures."

Japanese

See "East Asian Languages and Literatures."

Journalism

Professorial Lecturers F.L. Dennis, H.L. Coppenbarger
Associate Professors R.C. Willson, Philip Robbins (*Chairman*)
Associate Professorial Lecturers C.W. Puffenbarger, H.E. Paine, O.L. Mazzatenta, Peter Silberman, D.W. Burkett, R.L. Courage, George Cheely, J.P. McGill, Clare Crawford, Elie Rogers
Assistant Professorial Lecturers J.B. Baumann, J.C. Dawson, T.W. Zito, Jr., J.W. Coldsmith

Bachelor of Arts with a major in Journalism (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students planning to major in Journalism should take Engl 12 rather than Engl 11 in satisfying the English composition requirement.)
2. Prerequisite courses—Engl 51–52 or 71–72; Jour 71–72; PSc 4 and 6 or 5 and 6.
3. Required courses in the major—24 hours of second-group courses in Journalism, including (a) Jour 111, 196, 198; and (b) 9 semester hours chosen from Jour 121, 125, 133, 135, 137, 138, 139, 151.
4. Required as a minor area of concentration—a minimum of 18 semester hours of second-group courses, chosen in consultation with the major adviser, in one other department or field of study in Columbian College of Arts and Sciences.

Recommended Electives: Econ 121, 142, 161, 162, 181–82; PSc 103, 104, 121–22, 125, 126, 145, 146; Psyc 115; SPDR 133, 134, 135–36; Stat 53.

Departmental prerequisite: Jour 111 is prerequisite to Jour 125, 133, 135, 137, 138, 139, 190, and 196.

FIRST GROUP

71–72 Introduction to Mass Communication (3–3) Willson

Jour 71: evolution of newspapers and other media in relation to political, social, and economic life; concept of press freedom. Jour 72: mass media, problems of contemporary journalism, emphasis on federal government-media relations. (Academic year)

SECOND GROUP

111 **Reporting** (3) Robbins

Gathering, evaluating, and writing news. Some typing required. Laboratory fee, $5. (Fall and spring)

115 **Newspaper Editing and Make-up** (3) Coppenbarger

Preparation of news copy, pictures, and other graphic material for publication; evaluation of news; page layouts; newspaper make-up. (Fall)

116 **Magazine Layout and Design** (3) Paine

Layout, typography, and design for magazines, newsletters, house organs, and similar publications for associations, institutions, and industry. (Fall)

117 **Magazine Editing** (3)

The editor's responsibility to publisher and readers. Setting the editorial goals and planning content and production to meet them. Editing copy for general and specialized magazines.

121 **Feature Writing** (3) Willson

Free-lancing nonfiction articles, materials obtained through independent investigation. (Fall and spring)

125 **Science Writing** (3) Burkett

Writing science news for the mass media. (Spring)

133 **Advanced Reporting: Community News** (3) Puffenbarger

Coverage and writing of local news. (Fall)

135 **Advanced Reporting: Consumer Affairs** (3) Dawson

Specialized training in the consumer news field. (Fall)

137 **Advanced Reporting: National Affairs** (3) Silberman

Coverage and writing of federal government news. (Fall)

138 **Investigative Reporting** (3) Crawford

In-depth reporting in selected areas of political, economic, and social affairs. (Spring)

139 **Advanced Reporting: Radio and Television News** (3) Cheely

Preparing news and public affairs programs for broadcast media. (Spring)

140 **Photojournalism** (3) Mazzatenta, Baumann

Photographic techniques affecting publication, illustration and story angle, standards of judgment in selection and use of pictures, captions, editing, technique, cropping for effective reproduction. Laboratory fee, $25. The student must purchase his own film and print paper. A student who has received credit for Art 23 or Art 24 may not take this course for credit. (Fall and spring)

141 **Advanced Photojournalism** (3) Rogers

For advanced photojournalism students who want to master skills in news photography, editing, and layout. Special emphasis on story-telling pictures, picture essays, and photography in the print media. Laboratory fee, $25. Prerequisite: Jour 140 or Art 23–24. The student must purchase his own film and print paper. (Spring)

145 **Principles and Problems of Public Relations** (3) McGill

Principles, problems, and ethics of public relations for government agencies, commercial establishments, educational and other public institutions. Case histories of successful programs. (Fall)

146 **Government Information** (3) Courage

Growth of information activities in government and the role of the information specialist. Writing and editing for government information operations. (Spring)

150 **News Coverage in Washington** (3) Willson

The Washington news beats, channels and sources of news in the nation's capital, uses and abuses of the media. Field trips to local news centers and press briefings. Guest lecturers from the Washington press corps.

151 **Editorial Writing** (3) Robbins

Techniques of editorial writing, conducting the editorial page, function of editorials and columns of news commentary in a free press. (Spring)

155 **Critical Writing and Reviewing** (3) Zito

Reviewing and commenting on the arts and entertainment for the mass media.

160 **The New Journalism** (3) Robbins

A survey of the impact of fiction techniques on modern nonfiction reportage. Study of selected writers to identify influences and trends.

170 **News Publication Management** (3) Coldsmith

The business side of publishing. Study of the roles of advertising, circulation, promotion, accounting and administration, and mechanical departments in newspapers and other publications.

190 **Internship in Journalism** (3)

Study of a journalistic medium in action by assignment to a Washington area news office. Admission restricted to senior Journalism majors selected by a departmental committee. (Fall and spring)

*195 **Documentary Photography** (3) Lake and Staff

Social problems, team-taught. Each student will work on projects with social dimensions. Laboratory fee, $25. Admission by permission of instructor. Limited enrollment. (Spring)

196 **Senior Project** (3) Staff

Open only to journalism majors. Major journalistic effort undertaken in

* Interdepartmental course offered by the departments of Journalism and Art.

consultation with a member of the Journalism staff. A written request describing the project must be presented to the staff member for approval, and filed with the student's adviser in the semester before registration. (Fall and spring)

198 **Law of the Press** (3) Dennis

Freedom of the press, censorship, legislative controls, publications as contempt of court, copyright, newsgathering agencies, labor law and the newspaper business, law of libel, privileged matter, fair comment on public characters, right of privacy. (Fall)

Judaic Studies

COMMITTEE ON JUDAIC STUDIES

D.A. Altshuler (*Chairman*), R.H. Davison, R.E. Jones, Thelma Z. Lavine, Benjamin Nimer, Bernard Reich, H.M. Sachar, J.E. Ziolkowski

Columbian College of Arts and Sciences offers an interdisciplinary program in Judaic Studies leading to the degree of Bachelor of Arts. This program is intended for students who wish to investigate the history, language, literature, religious and philosophical thought, and political and social experience of the Jewish people from the perspective of several academic disciplines. (Students who wish to concentrate on the religious aspects of Judaism and its relationship to the other religious traditions of the world may prefer to elect a major in Religion with an emphasis on Judaism [see page 444].)

Bachelor of Arts with a major in Judaic Studies (Interdepartmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—Clas 21–22, 23–24; Rel 9, 10, 59–60.
3. Required courses in the major (30 semester hours):
   (a) Clas 103–4; Hist 158; Rel 135, 136, 238.
   (b) 12 semester hours selected from at least 3 of the following departments—Anth 177, 183; Art 112; Hist 109, 110, 193, 194; Phil 111, 112, 113; PSc 179, 180, 191; Rel 103, 104, 105, 126, 137, 138, 139, 172, 213.

Students applying for the 90-hour degree program in Judaic Studies must, in addition to meeting the general requirements (see pages 76–77, 83–89), present evidence of exceptional preparation in the field of Judaism, provide strong recommendations from high school teachers and or counselors, and complete a satisfactory interview with the Committee on Judaic Studies.

Latin

See "Classics."

Latin American Studies

COMMITTEE ON LATIN AMERICAN STUDIES

Marvin Gordon (*Chairman*), Fernando Belaunde-Terry, T.F. Carroll, Joseph Grunwald, R.L. Humphrey, Jr., P.F. Klarén, L.L. Perez, J.W. Robb, F.R. Siegel, K.L. Storrs, George Stuart

Bachelor of Arts with a major in Latin American Studies (Interdepartmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—Anth 2, Econ 1–2, PSc 4 or 5.
3. Required courses in related areas—Span 1–2, 3–4; or equivalent. (Span 9–10 or equivalent is recommended.)
4. Required courses in the major—(a) Anth 172, 184, or 185; Econ 185; Geog 161; Hist 163–64; PSc 177, 178; and 6 semester hours chosen from Span 151–52, 155–56, 157–58, or other approved courses. (b) 18 semester hours, including an interdisciplinary seminar (287) in one of the following areas: Anthropology, Economics, Geography and Regional Science, Hispanic Literatures, History, or Political Science. The required courses listed in (a) which are in the selected area may be included in computing the required 18 semester hours for (b).

Master of Arts in the field of Latin American Studies.—See the School of Public and International Affairs, pages 174–76, 177–78.

Candidates for the degree of Doctor of Philosophy may elect Latin American History as an area of specialization in the field of History, Spanish American Literature as an area of specialization in the field of Romance Languages and Literatures, or Politics of Latin America as an area of specialization in the field of Political Science.

COURSES DEALING WITH LATIN AMERICA

Anthropology—170, 172, 184, 185, 262, 268, 272, 287
Economics—185, 233, 234, 251–52, 287
Geography and Regional Science—127, 161, 261, 287
History—161, 163–64, 165, 166, 261–62, 287, 361–62
Political Science—177, 178, 277–78, 287
Portuguese—31–32
Spanish—91–92, 143, 151–52, 155–56, 157–58, 197–98, 253, 255, 256, 261, 264, 266, 287

Management Science

Professors R.F. Ericson, G.L. Lippitt, M.M. Wofsey, Peter B. Vaill, R.H. Walther (*Research*)
Professorial Lecturers C.W. Clewlow, M.H. Schwartz, Charles Laidlaw, Thomas O'Connor, Grace Hopper
Associate Professors J.F. McCarthy, Jr. (*Chairman*), T.E. Shaughnessy, R.L.

Holland, E.K. Winslow, Jerry Harvey, W.E. Smith, W.W. Hardgrave, Elizabeth Adams
Associate Professorial Lecturers C.E. Fisk, C.D. Villa
Assistant Professors John Lobuts, Jr., J.P. Coyne

Programs of study leading to the degrees of *Bachelor of Business Administration, Master of Business Administration, Doctor of Business Administration,* and *Doctor of Public Administration* are offered by the School of Government and Business Administration (see pages 133–63).

SECOND GROUP

118 **Introduction to Information Processing** (3) Smith, Coyne

Basic principles, terminology, and methods of computer data processing. Introduction to the use of the computer as a tool through homework assignments illustrating typical problems encountered in business and government data processing. Assignments involve flow charting and computer programming in a higher level language (FORTRAN) and are run on the University's computer and on the School's computer terminals. Laboratory fee, $25. (Fall and spring)

119 **Computer Programming for Information Systems** (3) Smith

COBOL programming for business and government data processing applications. For students already familiar with basic computer concepts, flow charting, and programming. Emphasis on practical computer applications in accounting and management information systems. Prerequisite: Mgt 118 or Stat 97. Laboratory fee, $25. (Fall and spring)

120 **Information Systems Development I** (3) Coyne, Smith, Demoody

Assessment of the systems concept and its relationship to organizational information decision-making and management. Concepts and techniques involved in the initial development of new or revised computer-based information systems, e.g., systems analysis and design phases. Prerequisite: Mgt 118, 119; or permission of instructor. Laboratory fee, $25. (Fall)

121 **Information Systems Development II** (3) Coyne, Smith, Demoody

A further examination of the information systems development process, including concepts and techniques for assessment, selection, introduction, operation, and maintenance of a newly designed automated information system. Prerequisite: Mgt 120 or permission of instructor. Laboratory fee, $25. (Spring)

122 **Special Studies in Information Systems** (3) Coyne, Smith, Demoody

An independent or group-study project in information systems development which may involve faculty-supervised research, a case-study project, or field experience as an intern systems analyst in a local public or private organization. Prerequisite: Mgt 121 or permission of instructor. (Fall and spring)

THIRD GROUP

201 **Advanced Administrative Management** (3) Ericson, Eastin, Brown, Roman, Adams

Overview of organization and management concepts and theory applicable

to all types of administrative units. Analysis of evolution of management functions and practices in various organizational contexts. Assessments, from a systems viewpoint, of ethical and moral issues confronting the modern manager, in the context of contemporary sociotechnical environment dynamics. (Fall and spring)

203 **Mathematics for Management** (3) Holland

Mathematical concepts employed in the solution of management problems. Applications of analytical geometry, functions, elements of calculus, and linear algebra to optimization problems. Prerequisite: algebra. (Fall and spring)

204 **Quantitative Factors in Administration** (3) Holland, Hardgrave

Survey of quantitative techniques used in the solution of management problems. Potentials and limitations of mathematical models and proper areas for their application. Topics include probability, statistical decision theory, linear programming, waiting line, inventory replacement models. (Fall and spring)

207 **Human Behavior in Organizations** (3) Lippitt, Winslow, Harvey, Vaill

Individual, group, intergroup, and other human behavior and development; application of social science research to administration. Learning exercises and practical applications emphasized. Prerequisite: Mgt 201. (Fall and spring)

208 **Current Issues in Organizational Behavior** (3) Winslow

Study of behavioral factors relating to issues such as automation, ethics, interpersonal relations, organizational change, and similar problems. Problems in behavioral science research. Prerequisite: Mgt 207. (Fall and spring)

210 **Behavioral Factors in the Process of Change** (3) Harvey, Vaill

Review of research, theory, and practice related to the process of change. Basic principles of planned change; individual, group, organization, community, and cultural change. Emphasis on the relationship between human behavior research and theory and the change process. Prerequisite: Mgt 207 or permission of instructor. (Fall and spring)

212 **Organizational Development: Concepts and Methods** (3) Lippitt, Harvey, Vaill

Primarily for doctoral students. Examination of different concepts of organizational structure, processes, and growth. Models of organizational change will be developed with a taxonomy of methods of initiating action to further organizational development. The methods of action, research, team building confrontation methods, objectives analysis, survey research, and structural revision will be related to organizational development processes. Prerequisite: Mgt 210 or equivalent. (Fall)

213 **Consultative Processes in Organizations** (3) Lippitt, Harvey

Primarily for doctoral students. Examination through actual practice as well as theory of the nature of the helping process between one person

or group and another person or group. Dynamics of the consulting process will be explored as well as role differences in internal and external consultation. Development of skill in the helping relationship will be furthered within the framework of interpersonal relation concepts and laboratory experiences. Prerequisite: Mgt 210 or equivalent. (Spring)

225 **Managerial Statistics I** (3) O'Connor

The mathematics of probability and statistics and its applications in management science and operations research. Topics include random variables; discrete and continuous probability distributions; moments and other descriptive measures; sampling theory; and an introduction to statistical estimation, and hypothesis testing. Prerequisite: Mgt 203 or equivalent. (Fall and spring)

226 **Managerial Statistics II** (3) Hardgrave

Management applications of the theory and techniques of mathematical statistics. Topics include maximum likelihood and other methods of estimation, hypothesis testing, descriptive measures of bivariate distributions, regression and correlation, analysis of time series, econometric models and multiple regression, statistical decision theory, and the revision of probabilities in decision-making. Prerequisite: Mgt 225. Laboratory fee, $10. (Fall and spring)

227 **Mathematical Programming: Techniques and Applications** (3) Hardgrave

Technical and management considerations of linear and nonlinear programming. Mathematical and computational aspects of linear programming. Formulation of linear programming models. Studies of applications of linear programming. Introduction to theory and application of nonlinear programming. Prerequisite: Mgt 203 or equivalent. Laboratory fee, $10. (Fall)

228 **Techniques of Operations Research** (3) Hardgrave

Survey and introduction to contemporary operations research techniques. Analytical methods such as simulation, queuing, inventory models, dynamic programming, integer programming, and network flows. Prerequisite: Mgt 225, 227.

229 **Seminar: Management Science and Operations Research** (3) Hardgrave

Supervised study in depth and advanced projects in management science and operations research. Prerequisite: Mgt 228, or permission of instructor. (Spring)

240 **Survey of Information Technology** (3) Adams, McCarthy

A management-oriented presentation of the vocabulary, concepts, and trends in computer hardware and software, information systems design and development, organizational impact, and effective management; milestones of past and current research; computer technology as a rapidly evolving force of major significance in business, government, and industry. Designed for students without prior information technology experience who do not plan to take additional information technology courses. Laboratory fee, $25. (Fall and spring)

241 **Management Information Systems Development and Application** (3) McCarthy

Contemporary theories and practices in the development of management information systems. Participation in the design of information systems specifications. The roles of both management and systems design personnel in the systems development process studied and evaluated. Impact of management information systems upon the organization and its decision-making processes evaluated. Case studies. Prerequisite: an introductory course in information technology, or permission of instructor. (Fall)

242 **Comparative Computer Systems** (3) Wofsey, Coyne

Characteristics and capacities of the range of information processing equipment in use today. Recent and prospective equipment and software development. Selection of computers and related software and equipment. Prerequisite: Mgt 241 or permission of instructor. (Spring)

243 **Management of Information Technology** (3) Adams

Advanced course; emphasis on principles, practices, and trends in the management of information technology. Topics include the role and control of an information processing installation; trends, new hardware, and advanced technology in the computing milieu and their implications for information processing management; an analysis of the performance of the data processing activity internally and externally, according to developed criteria. Case studies. Prerequisite: Mgt 241, 242; or permission of instructor. (Fall)

244 **Information Systems and Telecommunication** (3) Adams, Schwartz

Study of the growing linkages among the technology of information processing, information transmission, and organization management—computers, communications, and managers—from two points of view: (1) new potentials for improved management, and (2) solving communications-related problems of informations systems design, implementation, and operation. Admission by permission of instructor. (Fall)

245 **Data Base Management** (3) Smith, Coyne

An in-depth approach to the understanding and use of the latest techniques for developing and implementing an effective data base system. Topics include data base organization, creation, and maintenance; effort and economic justification; evaluation criteria; standardization of data base systems; impact of packaged data management systems; and an analysis of the current state-of-the-art in data base development. Students will become proficient in the use of an actual data base management system. Prerequisite: Mgt 119, 241. Laboratory fee, $25. (Spring)

249 **Seminar: Information Technology** (3) Wofsey, McCarthy

Current problems in the design and implementation of computer-supported systems; emphasis on current state-of-the-art through discussion with leading experts in the field, analysis of literature. Prerequisite: Mgt 241, 242, 243; or permission of instructor. (Fall and spring)

260 **Introduction to General Systems and Cybernetics** (3) Ericson, Adams

For graduate students only. Analysis of fundamental general systems concepts and cybernetic theory evolving in various branches of knowledge and

academic disciplines; emphasizes their transcontextual and interdisciplinary nature. Systems approach and general systems frame of reference compared and contrasted. Topics include living systems and cross-level hypotheses; pervasiveness of nature's entropic thrust; taxonomies of systems, feedback loops in open systems, and homomorphic and isomorphic relationships as conceptual tools. Cybernetic systems, such as homeostatic, heterodynamic, and morphogenic; metalanguages and metasystems; ultrastability and equifinality; essential requirements of a viable system.

261 **Fundamentals of General Management Systems and Organizational Cybernetics** (3) Ericson, Adams

(Formerly Mgt 224 Theory and Management of Systems)

Differentiation of systems management and general management systems approaches. Essential dynamics of organization and management from a GEMSOC standpoint. Organization structure and management process as systemic interfaces. Idealized organizational cybernetics, including on-line, real-time, and closed-loop systems. Decision-making and problem-solving as management focii; means-ends chains and bounded rationality. Organizational objectives and human values from a general systems standpoint. Prerequisite: Mgt. 201, 207, 260, or equivalent. Mgt. 204 is a recommended, not required, prerequisite.

263 **Case Studies and Field Research in GEMSOC** (3) Ericson, Adams

Investigations of existing organizational structures and ongoing management processes from a systems and cybernetics viewpoint. Operational evaluations of firms and agencies, including intercontextual comparative studies. Assessments of need for better tools of analysis and synthesis. Prerequisite: Mgt 261.

264 **Organizational Dynamics Simulation and Metasystemic Modeling** (3) Ericson, Adams

Literature review and current practice analysis. Operation research and conventional modeling techniques, including iconic, analog, and symbolic. Computerized organization dynamics simulation as a management tool. Institutional structure simulation and metasystemic modeling developed by students. Evaluation of organization dynamics modeling and the state of the science and art of computer simulation. Problems and prospects. Prerequisite: Mgt 261.

265 **Research Seminar in GEMSOC Theory** (3) Ericson, Adams

(Formerly Mgt 262 Seminar: Contemporary Administrative Theory)

For doctoral candidates only. Advanced seminar for research into latest advances in theoretical bases of general systems management and organizational cybernetics. Investigations into sources of GEMSOC concepts in literature of traditional fields. Evaluation of related synthetic and hybrid disciplines, such as bionics. Extensions of existing theory into new areas, such as managerial axiology. Prerequisite: Mgt 261.

266 **Philosophic and Policy Issues in Institutional Articulation** (3) Ericson, Adams

For doctoral candidates only. Institutional coherence of managerial decision-making in an "only one earth" frame of reference. Systemic articulation and metasystemic planning; the deliberate evolution of more effective institutional forms. Desiderata for responsive institutional struc-

tures from a general human system's viewpoint. Reconciliation of organizational and human participant value conflicts as a general management systems problem. Institutional sovereignty, organizational and human participant value conflicts as a general management systems problem. Institutional sovereignty; organizational morality and human values; the managerial search for systemic optimality. Prerequisite: Mgt 265.

290 **Special Topics in Management Science** (3) Staff
(Formerly Directed Readings and Research)
An experimental course enabling the department to develop new course topics and test new teaching methods. May be repeated once for credit. (Fall or spring)

295 **Research Methods** (3) Staff
Research techniques, sources of information, array and analysis of data, interpretation and presentation of the findings. (Fall and spring)

298 **Directed Readings and Research in Management Science** (3) Staff
(Formerly Mgt 295)
(Fall and spring)

299 **Thesis Seminar** (3) Staff
(Fall and spring)

300 **Thesis Research** (3) Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to doctoral students preparing for the general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to doctoral candidates. May be repeated for credit. (Fall and spring)

Mathematics

Professors David Nelson (*Chairman*), T.P.G. Liverman, Hewitt Kenyon, Choy-Tak Taam
Professorial Lecturers D.M. Dribin, Joseph Blum, Alvin Thaler
Associate Professors W.A. Smith, Dagmar Henney, Irving Katz, I.I. Glick, M.D. Green, Ruth Bari, Myrna Lee
Associate Professorial Lecturers S.L. Brodsky, Mabel Morris
Assistant Professors E.A. Stone, H.D. Junghenn
Assistant Professorial Lecturer Richard Werth

Bachelor of Arts or *Bachelor of Science with a major in Mathematics (Departmental).*—The following requirements must be fulfilled.

1. The general requirements as stated on pages 76–77, 83–89.

2. Prerequisite courses—Math 31, 32, 33 (Math 30, a prerequisite to Math 31, may be waived upon examination before registration).

3. Required courses in the major—a minimum of 24 semester hours of second-group courses in Mathematics, including Math 106, 121, 123, 139, and 140. It is also strongly recommended that students take French, German, or Russian, and mathematically related courses in such subjects as Physics, Statistics, Economics, and Engineering.

Bachelor of Arts or *Bachelor of Science with a major in Applied Mathematics (Departmental).*—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.

2. Prerequisite courses—Math 31, 32, 33, (Math 30, a prerequisite to Math 31, may be waived upon examination before registration).

3. Required courses in related areas:

(a) Stat 189–90.

(b) Eighteen semester hours to be selected, in consultation with the adviser, from the following Areas of Application. At least 12 semester hours must be chosen from one Area, and the other 6 semester hours must be chosen from courses numbered 101 or higher. For courses in Applied Science, Civil Engineering, Electrical Engineering and Computer Science, Engineering Administration, Mechanical Engineering, and Operations Research, see the *School of Engineering and Applied Science* catalogue.

Area I. Social and Management Sciences—courses chosen from ApSc 115, CE 183, 197; Econ 1–2, 101, 102, 123, 199; EAd 261, 269, 281 82, 283, 284; EE 184, 283, 284, 285; Math 101, 102, 113, 124; OR 201, 209, 251, 252, 261, 277, 279, 281, 291; Stat 113, 117, 118, 131, 157–58, 159, 161–62, 165–66, 188, 197.

Area II. Engineering and Physical Sciences—courses chosen from Chem 111–12, 113; CE 120, 123, 140, 166, 167, 168, 185, 186, 190, 191, 192, 193, 198, 201, 202, 203, 204, 205, 206, 207, 210, 220, 223, 252, 254, 258, 261, 262, 263, 275, Stat 107, 117, 118, 131, 157–58, 159, 161–62, 197; and any course offering in Electrical Engineering and Computer Science, Mechanical Engineering, or Physics.

Area III. Computer Sciences—courses chosen from EE 152, 153, 154, 157, 158, Math 102, 113, 124, 142, 153, 154, 157; Stat 113, 157–58, 161–62, 165–66, 197.

4. Required courses in the major—a minimum of 24 semester hours of second-group courses in Mathematics, including Math 111, 112, 139, 140, 181–82. It is also strongly recommended that students take French, German, or Russian.

Master of Arts in the field of Mathematics.—Prerequisite: a Bachelor's degree with a major in Mathematics from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. Students must complete 30 semester hours of approved course work with or without a thesis.

Master of Arts or Master of Science in the field of Applied Mathematics.—Prerequisite: a Bachelor's degree with a major in Mathematics or a related field such as Statistics, a physical science, Engineering, or Economics.

Required: the general requirements, pages 93–100. Course work is divided between Mathematics courses and courses from one Area of Application—Economics, Engineering (Civil, Computer Science, Electrical, Engineering Administration, Mechanical, or Operations Research), Physics, Statistics, Urban and Regional Planning. Courses in the chosen Area of Application are selected in consultation with the relevant department.

Candidates for the degree of Master of Arts must complete 30 semester hours of approved course work, including Math 299–300 *Thesis Research.* At least 15 semester hours must be in Mathematics courses, with no more than 3 of these from second-group courses. The remaining courses are chosen from the selected Area of Application. Theses are jointly supervised by the Department of Mathematics and

the department concerned with the Area of Application.

Candidates for the degree of Master of Science must complete 30 semester hours of course work; at least 15 of these must be in Mathematics courses, with no more than 6 semester hours from second-group courses. There is no thesis requirement.

Master of Science for Teachers—Prerequisite: A Bachelor's degree; at least 12 semester hours or equivalent in Mathematics courses, including the equivalent of Math 31; experience in teaching mathematics at the secondary school level.

Required: 30 semester hours of approved second- or third-group Mathematics courses, including Math 168.

Doctor of Philosophy in the field of Mathematics.—Required: the general requirements, pages 93–97, 100–102. The Department doctoral program committee, after consultation with the student, will stipulate (1) courses which must be taken to fulfill the 48-semester-hour requirement leading to the General Examination; (2) the two languages, selected from French, German, and Russian, which must satisfy the foreign language requirement; and (3) the four areas of study in which the student must prepare for the General Examination. The doctoral program committee will appoint a Director of Research when the student has selected (preferably early in his program) one of the following research fields for his dissertation: Functional Analysis (Abstract Differential Equations, Functional Equations, Generalized Functions, Groups of Operators), Group Representations, Linear Algebra (Matrix Theory), Logic, Measure and Integration, Ordinary and Partial Differential Equations, Theory of Numbers, and Topology (General Topology, Analytic Topology, Topological Groups).

Bachelor of Arts in Education with a teaching field in Mathematics.—Prerequisite: the Education curriculum, page 79.

Required: the Mathematics option and the professional courses listed on pages 117, 120–21.

FIRST GROUP

3 College Algebra (3) — Morris and Staff

Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry. (Fall and spring)

6 Plane Trigonometry (3) — Morris and Staff

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor). (Fall and spring)

9 General Mathematics I (3) — Smith and Staff

For students electing Math 9 and 10 as a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics. (Fall and spring)

10 General Mathematics II (3) — Smith and Staff

Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9. (Fall and spring)

30 Precalculus (3) — Bari and Staff

Set theory, inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school al-

gebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students must take a placement examination in algebra and trigonometry. (Fall and spring)

31 **Calculus of One Variable** (3) Green and Staff

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent.* (Fall and spring)

32 **Calculus of Several Variables** (3) Green and Staff

Vectors, determinants, partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31. (Fall and spring)

33 **Calculus of Vector Functions** (3) Green and Staff

Curves. Differential equations, infinite series, vector calculus, line integrals, Green and Stokes theorems. Prerequisite: Math 32. (Fall and spring)

†51 **Mathematics for the Social and Management Sciences I** (3) Glick and Staff

Notion of function, graph of function; sequences; differential calculus of functions of one variable; exponential and logarithmic functions. New students must take a placement examination in algebra prior to registration. (Fall and spring)

†52 **Mathematics for the Social and Management Sciences II** (3) Glick and Staff

Integral calculus of functions of one variable; functions of several variables; partial derivatives, maxima and minima, Lagrange multipliers; systems of linear equations and inequalities; matrix algebra, determinants, rudiments of linear programming. Prerequisite: Math 51. (Fall and spring)

SECOND GROUP

101 **Introduction to Mathematical Logic** (3) Nelson

Introduction to proof theory and model theory of propositional and predicate calculi, computability, topics from foundations of mathematics. Open to sophomores with permission of Department. Prerequisite: Math 32 or permission of instructor. (Fall)

102 **Axiomatic Set Theory** (3) Nelson

Zermelo-Fraenkel set theory, ordinals and cardinals, foundations of the real number system. Prerequisite: Math 101 or permission of instructor. (Spring 1976 and alternate springs)

103 **Foundation of Mathematics for the Nonmathematician** (3) Nelson

A popular approach. Set-theoretic foundations of mathematics; constructivism, finitary and intuitionistic mathematics, computability and decida-

* Math 30 may be waived as a prerequisite by examination on scheduled dates.
† Social and management science students with a strong record in high school mathematics are advised to take Math 31, 32, and 124 instead of Math 51 and 52.

bility; Turing machines and the Goedel theorems; the paradoxes; nonclassical systems of logic. Prerequisite: two years of high school mathematics. (Fall)

104 **Mathematics and Human Thought** (3) Dribin

Philosophical and historical aspects of mathematics and its interplay with other disciplines from antiquity to modern times. Prerequisite: two years of high school mathematics. (Spring)

106 **Introduction to Topology** (3) Kenyon

Prerequisite: Math 139 or permission of instructor. (Spring)

107 **Introduction to Algebraic Topology** (3) Bari

Prerequisite: Math 122 and 139, or permission of instructor. (Fall 1976 and alternate falls)

111 **Mathematics for Engineers and Physicists I** (3) Henney and Staff

Linear differential equations, linear algebra, Fourier series and integral, nonlinear differential equations of the first order. Prerequisite: Math 32.

112 **Mathematics for Engineers and Physicists II** (3) Henney and Staff

Ordinary differential equations, systems of differential equations, boundary-value problems, partial differential equations. Prerequisite: Math 111.

113 **Graph Theory** (3) Bari and Staff

Directed and undirected graphs; bridges, cutpoints, and blocks; connectivity; partitions; Eulerian and Hamiltonian graphs; planarity; coloring problems. Prerequisite: Math 32.

121–22 **Introduction to Abstract Algebra** (3–3) Lee and Staff

Selected topics in elementary number theory, groups, rings (including polynomial rings), and fields. Open to sophomores with permission of Department. Prerequisite: Math 32 or permission of instructor. (Academic year)

123 **Linear Algebra** (3) Lee and Staff

Theory of vector spaces, linear transformations, and matrices. Quadratic and bilinear forms, spectral decomposition. Prerequisite: Math 121. (Fall)

124 **Introduction to Matrix Theory** (3) Liverman

Operations on matrices, linear equations, matrix inversion, vector spaces, characteristic roots and vectors. Hamilton-Cayley Theorem. Systems of linear difference and differential equations. Quadratic forms. Prerequisite: Math 32 or permission of instructor. (Fall and spring)

134 **Introduction to Boundary-value Problems** (3) Staff

Prerequisite: Math 111 or 142. (Spring 1977 and alternate springs)

135 **Projective Geometry** (3) Dribin

Prerequisite: Math 123 or 124, or equivalent. (Fall 1975 and alternate falls)

139 **Advanced Calculus I** (3) Taam

Review and extension of elementary one-variable calculus, emphasis on the theoretical foundations; differential calculus of several variables. Prerequisite: Math 33. (Fall and spring)

140 **Advanced Calculus II** (3) Taam

Differential and integral calculus of several variables; contraction maps, implicit function and differential equation theorems. Prerequisite: Math 139 or equivalent. (Spring)

141 **Advanced Calculus III** (3) Glick

Tensors, differential forms, Stokes theorem, introductory differential geometry. Prerequisite: Math 140. (Fall)

142 **Theory of Differential Equations** (3) Liverman

Linear and some nonlinear differential equations. Topics include existence theorems, stability, control theory, limit cycles, and applications to physics and ecology. Prerequisite: Math 139 and 123 or 124, or permission of instructor. (Spring)

153 **Introduction to Numerical Analysis** (3) Brodsky

Introduction to fundamentals of numerical analysis using modern digital computers. Solution of linear systems and of ordinary differential equations. Interpolation polynomials. Iterative solution of nonlinear equations. Simple quadrature techniques. Prerequisite: Math 111 or 139, or equivalent. (Fall 1976 and alternate falls)

154 **Difference Equations** (3) Brodsky

Introduction to finite differences equations and their solution. Physical examples and analogies with differential equations are employed to motivate and apply the techniques developed. Generating functions. Analysis of error and stability characteristics. Prerequisite: Math 111 or 139, or equivalent. (Spring 1977 and alternate springs)

157 **Introduction to Complex Variable Theory** (3) Henney and Staff

Prerequisite: Math 139. (Spring)

*160 **Introduction to Abstract Algebra for Teachers** (3) Bari and Staff

Basic algebraic structures, such as groups, rings, integral domains, and fields; properties of integers and rational numbers. Prerequisite: Math 31 or equivalent.

*161 **Introduction to Linear Algebra for Teachers** (3) Bari and Staff

Linear functions, solution of equations, quadratic forms, change of basis. Prerequisite: Math 31 or equivalent.

*162 **Introduction to Geometric Theories for Teachers** (3) Bari and Staff

Postulational developments of Euclidean and non-Euclidean geometries. Prerequisite: Math 31 or equivalent.

*163 **Advanced Calculus for Teachers** (3) Bari and Staff

Rigorous re-examination of one-variable calculus, emphasis on limit, con-

* Open only to candidates for the degree of Master of Science for Teachers, teachers for in-service training, or students recommended by the Department of Education.

tinuity, differentiability, Riemann integration. Prerequisite: Math 160 or permission of instructor.

*164 **Foundations of Mathematics for Teachers** (3) Bari and Staff

Logic, set-theory, and foundations of the real number system. Prerequisite: Math 31 or equivalent.

*165 **Introduction to Theory of Numbers for Teachers** (3) Bari and Staff

Selected topics from the theory of numbers, including unique prime factorization, divisibility and the Euclidean algorithm, congruences and modular arithmetic. Prerequisite: Math 31 or equivalent.

*166 **Introduction to Graph Theory for Teachers** (3) Bari and Staff

Graph theory with applications to Markov chains (probability), programming, economics, psychology, biology, and puzzles. Prerequisite: Math 31 or equivalent.

*167 **Introduction to Topology for Teachers** (3) Bari and Staff

Elements of topology with some simple applications. Prerequisite: Math 163 or permission of instructor.

*168 **Seminar: Curriculum Studies** (3) Bari and Staff

Critical examination of secondary school mathematics curricula, techniques, and programs. Prerequisite: Math 31 and permission of instructor.

*169 **Proseminar in Mathematics for Teachers** (3) Bari and Staff

Topics in mathematics; emphasis on directed individual research. Prerequisite: Math 31 and permission of instructor.

181–82 **Seminar: Applied Mathematics** (3–3) Glick

Prerequisite: Math 140, Stat 189–90, some knowledge of linear algebra, senior status as major in Applied Mathematics. (Academic year 1975–76 and alternate years)

191 **Special Topics** (arr.) Staff

Admission by permission of instructor. May be repeated for credit. (Fall or spring)

195 **Reading and Research** (arr.) Staff

Under the personal direction of an instructor. Limited to Mathematics and Applied Mathematics majors with demonstrated capacity. Prior approval of instructor required. May be repeated for credit. (Fall or spring)

THIRD GROUP

Requirements for graduate degrees in Mathematics at George Washington University are described on pages 344-45. Courses in Mathematics for the fulfillment of these requirements are given jointly by Catholic University of America, George Washington University, and Georgetown University each year at one

* Open only to candidates for the degree of Master of Science for Teachers, teachers for in-service training, or students recommended by the Department of Education.

location (1975-76—Georgetown University; 1976-77—George Washington University).

Courses marked with an asterisk (*) are offered every year.

1974-75 TEACHING STAFF FROM COOPERATING UNIVERSITIES

Catholic University of America

Professors Witold Bogdanowicz, Parfeny P. Saworotnow
Associate Professors Gustav B. Hensel, John N. Welch
Assistant Professors Charles Byrne, Leonard J. Gallagher, Daniel Gallo, James N. Hagler, Francis E. Sullivan, Charlene Williams

Georgetown University

Professors John Lagnese, Herbert Maisel, Arnold P. Stokes
Associate Professors E. Ray Bobo, Richard F. Datko, J. Roger Teller
Assistant Professors George Benke, Giuliano Gnugnoli, Bruce Orcutt, Ronald Rosier, Allen B. Tucker, James Sandefur, Andrew Vogt

ALGEBRA

*201 **Graduate Algebra I** (3)
Groups, including Sylow theorems, direct decomposition of finitely generated Abelian groups, solvable nilpotent and simple groups, free groups (Fall)

*202 **Graduate Algebra II** (3)
Rings, including prime and maximal ideals, Euclidean and unique factorization domains, polynomial rings; modules over rings, including tensor product; semi-simple rings and algebras, including the Wedderburn theorem; Noetherian rings, including primary decomposition theorem. Prerequisite: Math 201 or permission of instructor. (Spring)

203 **Graduate Algebra III** (3)
Fields, including Galois theory, valuation theory. Prerequisite: Math 202 or permission of instructor. (Fall)

204 **Rings and Homology** (3)
Prerequisite: Math 202 or permission of instructor.

205 **Homological Algebra and Category Theory** (3)
Categories, functors, natural transformations; examples; functor categories; quotient categories; universal arrows, limits; adjoint functors, monads (triples); Abelian categories; imbedding theorems; modules, projective and injective; extensions and satellites, Ext and Tor. Prerequisite: Math 202 or permission of instructor.

206–7 **Quadratic Forms I–II** (3–3)
Prerequisite: undergraduate course in linear algebra.

208 **Combinatorics** (3)
Prerequisite: undergraduate modern algebra and linear algebra.

209–10 **Representations of Groups I–II** (3–3)
Prerequisite: Math 202 or permission of instructor.

211 **Group Theory I** (3) Teller
Infinite Abelian groups. Topics include direct sums and products, free Abelian and finitely generated Abelian groups, divisible groups, pure subgroups, and basic subgroups. Prerequisite: Math 201. (Spring)

212 **Group Theory II** (3)
Prerequisite: Math 211.

213 **Nonassociative Algebras** (3) Katz
Lie and Jordan algebra. Prerequisite: Math 202. (Fall)

214 **Algebraic Number Theory** (3)
Prerequisite: Math 203 or permission of instructor.

215 **Topics in Algebra** (3)

216 **Graph Theory** (3) Bari
Selected topics in graph theory from introductory topics to problems currently of research interest. (Spring)

ANALYSIS

*220 **Introduction to Modern Analysis** (3) Byrne
Real numbers, least upper bounds, completeness, Bolzano-Weierstrass theorem; Banach spaces, examples: R^n, C [a, b], l_1, l_2. Hilbert spaces; limits of real and vector sequences, limits of real and vector functions, all basic properties of real and vector continuous functions, differentiation and integration of real and vector functions, basic properties of compact sets, closed and open sets, linear transformations on R^n to R^m, fixed-point theorem and applications to differential and integral equations, Fourier series, Stone-Weierstrass theorem. (Fall)

*221 **Introduction to Complex Analysis** (3) Williams
Algebra, geometry, and topology of complex numbers; definitions and properties of elementary functions, e.g., e^z, sin z, log z; integrals, functions defined by integrals; Cauchy's theorem and formula, integral representation of derivatives of all orders; maximum modulus, Liouville's theorem, fundamental theorem of algebra; Taylor and Laurent series; uniform convergence, term-by-term differentiation; domain of convergence and classification of singularities; contour integration; the residue theorem; evaluation of integrals involving single-valued functions; analytic continuation, multivalued functions, and branch points; technique for contour integrals involving multivalued functions. Prerequisite: Math 220 or equivalent. (Fall)

222 **Applications of Complex Analysis** (3) Henney
Potential theory and conformal mapping. Special functions. Asymptotic expansions; steepest descent, stationary phase, and WKB methods. Fourier and Laplace transforms, applications to partial differential equations. Wiener-Hopf method, dual and singular integral equations. Prerequisite: Math 221 or an undergraduate course in complex variables. (Spring)

223 **Advanced Complex Analysis** (3)

Harmonic functions, partial fractions, Mittag-Leffler theorem; infinite products, entire functions, the Hadamard product theorem, the gamma function, representations of the gamma function; Hurwitz's theorem; normal families of functions, Montel's theorem, the Riemann mapping theorem, elementary conformal mapping; analytic continuation, the monodromy theorem, branch points, Riemann surfaces. Prerequisite: Math 221 or equivalent.

*224 **Measure and Integration Theory** (3) Hagler

Lebesgue integration over the space of reals; the basic convergence theorems, including monotone and dominated convergence theorems; measurability; almost everywhere differentiability of monotone functions; absolute continuity; the Lp spaces and orthogonal expansions; duality of Lp and Lq spaces; orthonormal systems in L_2 (a, b); integration over the space R^n; theorems of Fubini and Tonelli. Prerequisite: Math 220 or equivalent. (Spring)

*225 **Introduction to Functional Analysis** (3) Rosier

Topological and metric spaces; compact spaces and Tychonoff theorem; complete metric spaces and completion of a metric space; Normed and Banach spaces; linear functions; Hahn-Banach theorem; principle of uniform boundedness and applications; elementary introduction to distribution theory; linear operators; the closed-graph theorem and interior mapping principle; Hilbert spaces; inner product, orthogonality, and orthonormal systems; eigenvalues, eigenvectors, invariant subspaces, and projection operators; operational calculus of functions defined on the spectrum. Prerequisite: Math 220 or equivalent. (Fall)

*226 **Banach Algebras and Spectral Theory of Operators** (3) Rosier

Gelfand theory of commutative Banach algebras; function algebras; Stone Cech compactification; application to the spectral theory of operators, spectrol theorem for bounded and unbounded operators; Jacobson radical for arbitrary Banach algebras; H*-algebras and Hilbert modules, related topics. Prerequisite: knowledge of measure and integration, introduction to functional analysis, and Tychonoff and Stone-Weierstrass theorems. (Spring)

227 **Fourier Analysis on Locally Compact Groups** (3)

Elementary properties of topological groups, existence of Haar measure, modular functions, group algebras; application of Gelfand theory to the group algebra; applications to classical theory of Fourier series and integrals; compact and discrete groups, Plancherel and Pontryagin theorems; positive definite functions and positive linear functionals, Stone and Bochner theorems; representations of a compact group G; H*-algebra valued positive definite functions, generalization of Stone and Bochner theorems, their application to multivariate and infinite dimensional stationary processes; related topics. Prerequisite: knowledge of topological groups, measure and integration, and introduction to functional analysis, and some familiarity with Gelfand theory.

228 **Theory of Generalized Functions and Distributions** (3) Glick

Fréchet and countable union spaces; definition, structure, and properties of Schwartz distributions and generalized functions; applications to explicit

solutions and existence theory of ordinary and partial differential equations, nested Hilbert spaces; generalized Fourier transform. Prerequisite: Math 220 or permission of instructor. (Spring)

229 **Ergodic Theory** (3)

Topics selected to serve research interests of instructor and students; emphasis on recent developments and applications to dynamical systems and Markov processes. Prerequisite: Math 224, 225; or permission of instructor.

230 **Differential Equations in Banach Space** (3)

General theory of linear and nonlinear differential equations in Banach space; periodic and almost periodic solutions; stability of solutions. Prerequisite: Math 225 or permission of instructor.

231 **Semi-groups of Operators and Almost Periodic Functions** (3)

Almost periodic functions on the real line and on groups; general theory of weakly almost periodic semi-groups of operators, their asymptotic behavior and convergence into almost periodic groups of operators. Prerequisite: Math 224, 225, 226; or permission of instructor.

232 **Seminar: Functional Analysis** (3)

Topic selected to serve research interests of instructor and students; qualified students encouraged to work on research projects. Admission by permission of instructor.

233 **Foundations of Probability Theory and Statistics** (3)

Review of the basic concepts of measure and integration theory; probability and expectation; random variable, random process; distribution function and Kolmogorov consistency theorem; characteristic function of a random variable; distributions of Bernoulli, Poisson, Gauss, Polya, Cauchy, Laplace; applications; stochastic independence; Kolmogorov's strong law of large numbers; central limit theorem; applications to statistics.

234 **Introduction to the Theory of Random Processes** (3)

Stochastic dependence, conditional expectation, limit theorem for submartingales; Markov process; theory of Markov chains; Poisson's process; process of birth and death; Kolmogorov-Chapman equations; second-order stationary random processes; filtering and prediction; Wiener-Hopf equation and its solution; second-order discrete stationary random processes. Prerequisite: Math 233.

*235 **Linear Algebra** (3) Saworotnow

Vector spaces, affine spaces; linear transformations, invariant subspaces; matrices, determinants, tensor products; inner-product spaces, orthogonality; linear functionals, dual spaces, adjoint transformations; spectral theorem; quadratic forms; Hilbert spaces. (Fall)

236–37 **Introduction to Optimization Theory in Hilbert Spaces I—II** (3–3) Taam

Basic methods of functional analysis applicable to optimization problems in control, communication, and other areas in system science. Topics covered include review of basic properties of Hilbert spaces, operators,

compact and nuclear operators, semigroups of linear operators, measure theory in Hilbert spaces, problems in control theory, information theory, convex programming and games. Prerequisite for Math 236 is Math 224, 225. Prerequisite for Math 237 is Math 236. (Academic year)

238 **Introduction to Probability Theory** (3) Junghenn

Discrete and continuous probability distributions; conditional probability, random variables; expectation; binomial, Poisson, and normal distributions; laws of large numbers; Markov chains; applications. Prerequisite: knowledge of advanced calculus. (Fall)

239 **Introduction to Stochastic Processes** (3) Benke

Brief discussion of probability theory, general notion of stochastic process, normal processes and autocovariance function, Wiener process, harmonic analysis of processes, Poisson process, renewal counting processes, Markov chains with discrete and continuous parameter. (Spring)

APPLIED MATHEMATICS

*240 **Introduction to Ordinary Differential Equations** (3) Sandefur

First course in ordinary differential equations; existence and uniqueness of solutions; continuity of solutions with respect to initial conditions; properties of linear systems. Prerequisite: advanced calculus. (Fall)

241 **Stability Theory of Ordinary Differential Equations** (3) Stokes

Introduction to basic notions of stability and asymptotic stability; Liapounov's functions used to establish stability or instability; converse theorems of Liapounov's direct method; comparison theorems, differential inequalities. Prerequisite: Math 240 or permission of instructor. (Spring)

242 **Theory of Dynamical Systems** (3)

Basic properties of dynamical systems; α and ω limits sets, recurrent motions, minimal sets; ergodic motions, ergodic theorems of Birkhoff and Von Neumann. Prerequisite: Math 240 or permission of instructor.

243 **Theory of Nonlinear Oscillations** (3)

Existence and stability of periodic solutions of ordinary differential equations; derivation of bifurcation equation for weakly nonlinear systems; introduction to the method of averaging, the existence and stability of almost periodic solutions and integral manifolds. Prerequisite: Math 240 or permission of instructor.

244 **Theory of Differential Equations with Delays** (3)

Basic theory of functional differential equations (differential-difference equations, equations with delay); theory of linear systems, constant or periodic coefficients; stability theory, Liapounov functionals; existence and stability of periodic and almost periodic solutions. Prerequisite: Math 240 or permission of instructor.

245 **Eigenvalue and Boundary-value Problems** (3) Welch

Normed spaces, integral equations, spectral theory of compact operators; application to boundary and eigenvalue problems of ordinary differential equations. Prerequisite: advanced calculus. (Spring)

246 **Numerical Methods in Ordinary Differential Equations** (3)

Finite difference methods for initial-value and boundary-value problems; error analysis, analysis of stable schemes; Galerkin's method, with estimation of error in eigenvalue problems. Prerequisite: Math 240 or permission of instructor. (Spring)

247 **Control Theory of Ordinary Differential Equations** (3)

Optimal control of linear systems, control of linear systems with convex cost functionals, the maximal principle and selected topics on control systems.

248 **Fourier Analysis and Integral Transforms** (3) Benke

Fourier series, Fourier integral in one and several variables, Fourier-Stieljes transform, inversion of Fourier transforms, Tauberian theorems, bilateral Laplace transform and applications. Prerequisite: advanced calculus, knowledge of Lebesgue integration, acquaintance with the elementary parts of the theory of functions of a complex variable. (Fall)

249 **Differential Games** (3) Glick

The idea of a differential game. Examples, discrete games, procedures for solving certain types of games, and the study of surfaces involved in solving differential games. (Spring)

250 **Calculus of Variations** (3) Byrne

Introduction to the calculus of variations via the notion of the Frechet derivative, the Euler equations, the Hamilton-Jacobi equations; sufficient conditions for a solution to exist, applications to mechanics and physics.

251–52 **Techniques of Partial Differential Equations I—II** (3–3) Liverman

(Formerly Partial Differential Equations with Applications to Mathematical Physics I-II [3–3])

Math 251: Study of classical first and second order equations in two to four variables. Applications to probability theory and mathematical physics. Prerequisite: knowledge of advanced calculus and rudiments of linear algebra and complex variables. Math 252: First order equations and systems in n variables. Hamilton-Jacobi theory. Characteristics and bicharacteristics. Variational methods. Integral equations. Prerequisite: Math 251, knowledge of undergraduate linear algebra and analytic function theory. (Academic year)

253–54 **Introduction to Numerical Analysis I–II** (3–3) F. Sullivan

Elements of theory and practice of numerical analysis using modern digital computers; solution of linear systems and nonlinear equations; computation of eigenvalues and eigenvectors; basic approximation theory; interpotation techniques; numerical quadrature; solution of differential equations. Prerequisite: knowledge of advanced calculus. (Fall and spring)

255 **Introduction to Generalized Functions and Fourier Transforms** (3)

Sequential definition of generalized functions—operational solution of differential equations and systems. Generalized function Fourier series, generalized function Fourier and Laplace transforms, applications to initial and boundary-value problems. Prerequisite: Math 220 or knowledge of advanced calculus.

256 **Integral Equations** (3)

Volterra linear integral equations of first and second kind with applica tions to linear ordinary differential equations; Fredholm linear integra equations of first and second kind, applications to Sturm-Liouville prob lems; some singular or nonlinear integral equations.

257 **Control Theory of Partial Differential Equations** (3)

Minimization of functionals and boundary-value problems; control of systems governed by elliptic partial differential equations; control of sys tems governed by parabolic partial differential equations; control of systems governed by hyperbolic partial differential equations; regularization, approximation, and penalization.

258 **Numerical Methods of Partial Differential Equations** (3)

Numerical treatment of the typical initial and boundary-value problems for hyperbolic, parabolic, and elliptic equations of mathematical physics; finite difference schemes, solutions, convergence to solutions of partial differential equations; stability, error analysis, suitability of methods for practical use in digital computers.

259 **Selected Topics in Partial Differential Equations I** (3)

260 **Selected Topics in Partial Differential Equations II** (3)

261 **Applied Linear Algebra** (3) Datko

Application of linear algebra to problems occuring in ordinary differential equations, stochastic processes, control theory, and the social and life sciences. (Spring)

262 **Convex Sets with Applications** (3)

Study of convexity and its application to linear programming.

264 **Approximation and Curve Fitting** (3)

General introduction to theory and computational methods of linear approximation; emphasis on least squares and uniform approximation, including discussion of computer implementation of widely used algorithms; programming assignments dealing with typical applications. Prerequisite: knowledge of advanced calculus.

265 **Computational Methods for Nonlinear Problems** (3)

Topics in the area of optimization and function minimization; emphasis on analytic and computational aspects of nonlinear iterative methods and their applications to various physical problems; programming assignments dealing with typical applications. Prerequisite: knowledge of advanced calculus.

†266 **Computer Mathematical Languages with Applications I** (3) Bogdanow

Timesharing system. Elements of BASIC: syntax, numerical scale, error estimates in computation. Elements of PIP, TECO, and MONITOR COMMANDS. FORTRAN IV: syntax, numeric scales and their errors. Subroutines; local and global variables; function subroutines. Appli

† These courses are not intended for computer sciences specialists.

tions. Use of subroutine libraries. Business type applications. Prerequisite: knowledge of calculus. (Fall)

†267 **Computer Mathematical Languages with Applications II** (3) Bogdanowicz

Review of timesharing system, PIP, TECO, MONITOR COMMANDS, FORTRAN IV, ALGOL. Control of peripheral devices from FORTRAN, ALGOL, and file capability. Generation of programs in MONITOR LEVEL and their applications. Use of system utility programs. Prerequisite: knowledge of advanced calculus and elements of FORTRAN or BASIC. (Spring)

268 **Introduction to Applied Mathematics** (3) Vogt

Sampling of topics in applied mathematics treated in an introductory manner with emphasis on interest rather than technique; the two-body problem, Hamiltonian and Lagrangian formalism, heat and wave equations, matrix models in biology and economics.

COMPUTER SCIENCE

270–71 **Simulation of Discrete Stochastic Systems I–II** (3–3)

Introduction and definition of simulation system, discrete and continuous, stochastic and deterministic, critical event and time-slice; general outline of a simulation, how it is used and how it functions; procedure for developing a simulation; statistical topics; generating random numbers. Simulation programming and languages, simulating the passage of time and arrivals, FORTRAN, queues and list processing, PL/1, SIMSCRIPT, GPSS, general remarks; GPSS, basic concepts; simulation of computer systems; case study. Prerequisite: knowledge of computers and statistics.

272 **File and Data Management and Information Processing** (3) Gnugnoli

External data structures, graph theory, paths, chains, trees, lists, sublists, multilinked lists, directories; basic structure-processing operations, creation, updating, sorting, merging, searching linkage, hashing, Boolean searches; storage media and input/output devices; software; introduction to file organizations; consecutively organized files; keyed files; file arrangement and application; introduction to the processing, storage, and retrieval of data, emphasis on computer techniques. Prerequisite: introduction to data structures and PL/1 programming. (Fall)

273 **Theory of Formal Languages and Applications** (3) Tucker

Introduction to formal languages and their related automata, applications in compiler design. Regular, context-free, context-sensitive, and unrestricted grammars; finite and pushdown store automata; Turing machines; the halting problem; formal description of programming languages' syntax and semantics; syntax-directed compiling techniques; compiler-compilers; additional topics in compiler construction. Prerequisite: introductory computer course; course in abstract algebra is recommended. (Fall)

274 **Compiler Construction** (3)

Prerequisite: Math 273. (Spring)

† These courses are not intended for computer sciences specialists.

275 **Operating Systems** (3)

Prerequisite: Introduction to systems programming. Intermediate cal culus, college algebra, proficiency in FORTRAN or PL/1 programming (Spring)

LOGIC

*278 **Introduction to Mathematical Logic** (3) Henso

Propositional and predicate calculus (first order): syntax, formation rule semantics, axioms, proof and deduction, object vs. metalanguage, deduc tion theorem, compactness theorem, Godel-Henkin completeness theorem Craig's interpolation theorem, Beth's definability theorem. First-order recursive arithmetic: incompleteness and undecidability. (Fall)

279 **Model Theory** (3)

Prerequisite: Math 278 or permission of instructor.

280 **Proof Theory** (3)

Prerequisite: Math 278 or permission of instructor.

281 **Computability and Decidability** (3) Nelson

Prerequisite: Math 278 or permission of instructor. (Spring)

282 **Set Theory** (3)

Prerequisite: Math 278 or permission of instructor.

TOPOLOGY

285–86 **General Topology I–II** (3–3)

General topological spaces, continuity, quotient spaces, product spaces filters, nets, separation axioms, compactness and connectedness (globa and local). Metrization, compactification, uniform spaces, uniform con tinuity, complete spaces, and topological groups. (Academic year)

287–88 **Topological Vector Spaces I–II** (3–3)

Topological vector spaces, vector space topologies, linear manifolds, me rizability and complexification. Locally convex topological vector spaces Hahn-Banach theorem, projective and inductive topologies, barreled an bornological spaces. Linear mappings, Banach's homomorphism theorem equicontinuity; uniform boundedness and the Banach-Steinhaus theorem Tensor products, nuclear mappings and spaces. Duality; dual systems and weak topologies; Mackey-Arens theorem; strong dual, bidual, and reflexive spaces; theorems of Grothendieck, Banach-Dieudonne, an Krein-Smulian; open mappings and closed graph theorems; weak com pactness; theorem of Eberlein and Krein. Prerequisite: general topology including uniform spaces, linear algebra, and real and complex variable

289 **Topological Groups** (3)

General theory of topological groups; neighborhood systems of the iden tity; uniform structures on groups, products, and inverse limits. Locally compact groups, classical linear groups, Lie groups. Open homomorphis

and closed graph theorems, integration on locally compact groups, finite-dimensional representations of groups Schur's lemma, Peter-Weyl theorem, structure of metrizable compact groups. Duality, dual groups of locally compact Abelian groups, dual groups of compact and discrete groups. Prerequisite: general topology, including uniform spaces, linear algebra, and elementary group theory.

290 **Differentiable Manifolds** (3)

Differentiable manifolds, tangent vectors and differentials, submanifolds, imbeddings and immersions, quotient manifolds, vector fields, Frobenius' theorem, tensors and differential forms, Lie derivatives, manifolds with boundary, orientable manifolds, Stokes' theorem, and the divergence theorem. Prerequisite: advanced calculus, linear algebra; or permission of instructor.

291 **Differential Geometry** (3)

Riemannian manifolds, geodesics, curvature and torsion, linear connections, Gauss-Bonnet theorem, Hopf index theorem, Morse index theorem; applications to mechanics, cohomology, and the de Rham theorem; the Laplace-Beltrami operator; Lie groups. Prerequisite: Math 290.

292 **Introduction to Homotopy Theory** (3)

Two-dimensional manifolds, classification theorem for compact surfaces, the fundamental group, homotopy type, homotopy equivalence of spaces; free groups and free products of groups, presentation by generators and relations; Seiffert-Von Kampen theorem, covering spaces of a graph, applications to group theory.

293 **Introduction to Homology Theory** (3)

Axioms and uniqueness, Eilenberg-Steenrod axioms and some immediate consequences. Uniqueness theorem. Computation of homology groups, elementary applications, e.g., invariance of dimension, extensions and retractions, fixed-point theorems, etc. Cellular homology groups, singular homology theory.

ESEARCH

*295 **Reading and Research** (3) Staff

May be repeated once for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

OURTH GROUP

*398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

*399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Microbiology

Professors Mary Louise Robbins, Rudolph Hugh, E.M. Lerner II (*Research*)
L.F. Affronti (*Chairman*)
Professorial Lecturer Dorothy Heilman (*Cellular Immunology*)
Associate Professors Melvin Reich, Kun-yen Huang, Phyllis Kind
Assistant Professors Yang-Ming Chu, Rosalie De Giovanni-Donnelly (*Research*)

Master of Science in the field of Microbiology.—Prerequisite: a Bachelor's degree with a major in Biology, Botany, Chemistry, or Zoology from this University, or an equivalent degree. The undergraduate program must have included the following courses or equivalent: BiSc 11–12; Chem 11–12, 151–52, 153–54; Math 30, 31 (31 may be taken concurrently with the graduate program); Phys 1, 2.

Required: the general requirements, pages 93–100. A total of 30 semester hours is required, 24 hours of course work and 6 hours of thesis (Micr 299–300). The course work must include Micr 211, 212 (if not presented for admission), plus Bioc 221–22, Micr 219–20, 277–78; and an approved biostatistics course. The remaining academic work should consist of graduate-level courses selected with the approval of the instructor.

Doctor of Philosophy in the field of Microbiology.—Required: the general requirements, pages 93–97, 100–102. Candidates must fulfill the tool requirement by passing a reading knowledge examination in French and German or by passing an examination in one of these languages and satisfactorily completing the tool requirement in biostatistics. The General Examination covers at least four fields, two of which must be in microbiological disciplines.

Research fields: Clinical Microbiology, Determinative Bacteriology, Immunochemistry, Immunology, Microbial Genetics, Microbial Pharmacology, Microbial Physiology, and Virology.

211 **Microbiology** (4) Staff

Bacteria, fungi, rickettsiae, immunological concepts, and viruses. Laboratory fee, $16. (Fall)

212 **Pathogenic Microbiology** (4) Staff

Continuation of Micr 211; emphasis on pathogenic activities of microorganisms. Prerequisite: Micr 211. Laboratory fee, $16. (Spring)

214 **Tissue Cell Culture and Somatic Variation** (4) Chu

Techniques of tissue culture and means of studying somatic variations. Prerequisite: Micr 211 or equivalent. (Spring)

219–20 **Scientific Writing for Graduate Students** (1–1) Robbins

Required of all graduate students prior to writing a thesis or dissertation. Some research experience required. (Academic year)

225 **Microbial Physiology I** (3) Reich, Affronti

Morphology and biochemistry of various microorganisms with emphasis on bacteria. Prerequisite: Bioc 221–22, Micr 211 or equivalent. (Fall)

226 **Microbial Physiology II** (3) Reich, Affronti

Effects of physical and chemical agents on microorganisims with emphasis on antibiotics. Prerequisite: Micr 225 or permission of instructor. (Spring)

229 **Immunology** (3) Kind, Affronti

Lecture course. Fundamental immunologic concepts. Lecturers will cover antigens, antibodies, antigen-antibody reactions *in vitro* and *in vivo*, and the immune response. Prerequisite: Micr 211 or permission of instructor. (Fall)

230 **Immunology Laboratory** (2) Kind, Affronti

(Formerly Immunology [3])

Serologic and immunologic procedures as applied to clinical and research situations emphasized. Prerequisite or concurrent registration: Micr 229, or permission of instructor. Laboratory fee, $16. (Fall 1975 and alternate falls)

231 **Immunobiology** (1) Affronti, Kind

Study of immunological functions of reticulo-endothelial tissues, theories of auto-immunity, graft rejection, tumor immunity, delayed hypersensitivities, and immunogenetics. Clinical faculty discuss relevant aspects of immunobiology. Admission by permission of instructor. (Fall)

233 **Biology of Viruses** (2) Robbins, Huang

Biochemical and genetic characterization of viruses. Prerequisite: Micr 211 or equivalent. (Fall)

234 **Biology of Viruses—Laboratory** (2) Robbins, Huang

Laboratory complement to Micr 233. Prerequisite or concurrent registration: Micr 233. Laboratory fee, $20. (Fall)

235 **Systematic Bacteriology** (2) Hugh

History of bacterial classification, international rules of nomenclature as applied to bacteria, development of bacterial classification based on relationships, survey of characteristics of bacterial groups. Prerequisite: Micr 212 or equivalent. (Fall 1976 and alternate falls)

251 **Clinical Laboratory Bacteriology** (3) Hugh

For graduate students; open to medical students. Detection and identification of bacterial agents which cause diseases in man. Comparative isolation and identification methods; emphasis on interpretation and significance of laboratory observations. Prerequisite: Micr 212 or equivalent. (Fall)

255 **Virology** (1) Huang

General principles of virology; emphasis on clinical situations. Prerequisite: Micr 212 or equivalent. (Fall)

257 **Experimental Immunochemistry** (3) Affronti

Biochemical and physiochemical characterization of antigens and antibodies. Prerequisite: Bioc 221–22 or equivalent, Micr 229. Laboratory fee, $20. Limited enrollment. (Spring 1976 and alternate springs)

258 **Microbial Genetics** (2) De Giovanni-Donnelly

Survey of microbal systems that depict basic concepts of genetic principles. Prerequisite: Micr 211 or equivalent. (Spring)

260 **Cellular Immunology** (1) Kind
Advanced seminars in cellular aspects of the immune response. Pre-requisite: Micr 229.

277–78 **Seminar: Microbiology** (1–1) Staf
Required of graduate students. (Academic year)

293 **Special Topics in Microbiology** (arr.) Staf
Selected topics in microbiology. May be repeated for credit. (Fall and spring)

295 **Research in Microbiology** (arr.) Staf
Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staf
(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staf
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staf
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Music

Professor George Steiner (*Chairman*)
Associate Professors Robert Parris, N.A. Tilkens
Adjunct Assistant Professor Margaret Tolson
Assistant Professorial Lecturers N.O. Scribner, Jr. (*Organ*), R.J. Guenther
Studio Lecturers in Applied Music W.B. Dobry (*Piano and Organ*), Sura Kim (*Piano*), J.E. Marlow (*Guitar*), Marian McNabb (*Piano and Organ*), Ylda Novik (*Piano*), Malinee Peris (*Piano*), W.D. Petterson (*Piano*), Constance Russell (*Piano*), C.O. Dash (*Voice*), S.H. Prussing (*Voice*), Jane White (*Voice*), Richard Parnas (*Violin and Viola*), R.J. Ferruzza (*Guitar*), R.A. Norris (*Guitar*), R.C. Raffaelle (*Guitar*), Dorothy Jarvinen (*Cello*), J.S. Martin, Jr. (*Cello*), N.M. Irvine (*Bass*), W.E. Fuhrman (*Flute*), W.H. Mann (*Flute*), T.P. Perazzoli (*Flute*), R.O. White (*Oboe*), W.R. Wright (*Clarinet and Saxophone*), Lewis Lipnick (*Bassoon and Recorder*), Walter Maciejewicz (*Bassoon*), W.E. Arsers (*French Horn*), S.E. Ramsay (*French Horn*), G.W. Recker (*Trumpet*), R.H. Kraft (*Trombone and Recorder*) T.H. Wardlow (*Percussion Instruments*), Faith Carman (*Harp*)

Bachelor of Arts with a major in Music History and Literature, Music Theory or Applied Music (Departmental).—The following requirements must be fulfilled
1. The general requirements as stated on pages 76–77, 83–89.

2. Prerequisite courses—Mus 5–6, 6 hours of Applied Music lessons, a minimum of 4 semesters in Music Ensemble groups (or evidence of equivalent experience).
3. Required courses in related areas—12 hours of one foreign language (French, German, or Italian recommended).
4. Required courses in the major—Mus 103–4, 131–32; 6 additional hours of Music Theory courses; 6 additional hours of Music History and Literature courses; plus 6 hours of courses in the area of the major. (Music Theory majors must meet departmental requirements for proficiency in piano; Applied Music majors must perform a complete public recital or the equivalent in major solo performances.)

Master of Arts in the field of Musicology.—Prerequisite: a Bachelor's degree with a major in music, or an equivalent degree.

Required: the general requirements, pages 93–100. The program of study consists of (1) 30 semester hours of course work including a thesis (6 semester hours), or (2) with the approval of the Department, 30 semester hours of course work without a thesis.

Master of Music in the field of Music Theory, Music Composition, Conducting, or Applied Music.—Prerequisite: a Bachelor's degree with an undergraduate major in one of the following, at this University, or an equivalent degree: (1) Music History and Literature, (2) Music Theory, or (3) Applied Music.

Required: the general requirements, pages 93–100. The required second- and third-group course work is as follows:

1. *In the field of Music Theory*.—Thirty semester hours of course work including either (a) a thesis (6 semester hours) demonstrating research ability in theoretical, creative, or analytical techniques; or (b), with the approval of the Department, 6 semester hours of Music Theory courses in lieu of a thesis.
2. *In the field of Music Composition*.—Thirty semester hours of course work including a creative thesis of one composition in large form properly prepared for performance (chamber music, a symphonic form, or a choral work with orchestral accompaniment) including a written theoretical, formal, and harmonic analysis of the work.
3. *In the field of Conducting*.—Thirty semester hours of course work including a thesis (6 semester hours) demonstrating research ability in theoretical, creative, or analytical techniques; or, with the approval of the Department, 30 semester hours of course work without a thesis. The requirements also include an acceptable public conducting performance.
4. *In the field of Applied Music*.—Thirty semester hours distributed as follows: (a) 12 semester hours of Applied Music in the area of concentration (piano, harpsichord, organ, voice, string or orchestral woodwind instrument); (b) 12 semester hours of Music Theory and Music History and Literature courses; and (c) a thesis (6 semester hours). The thesis consists of a public recital or performance before a designated committee—such a recital or performance must be representative of an extensive and well-rounded repertory, performed on a professionally accepted artistic level, including verbal historical and analytical lecture notes on the musical content of the program; demonstrated leadership in an ensemble performance (opera or oratorio for voice); and a written report on some approved theoretical area related to the student's concentration.

Bachelor of Arts in Education with a teaching field in Music.—Prerequisite: the Education curriculum, page 79.

Required: the Music option and professional courses listed on pages 117–18, 120–21.

MUSIC HISTORY AND LITERATURE

FIRST GROUP

3 **Introduction to Musical Understanding** (3) Steiner, Tilkens

Introductory history of musical styles, related to listening; elements and materials of music. (Fall and spring)

4 **Survey of Music Literature** (3) Steiner

Introductory study of musical forms, structures, and textures; aural analysis of selected literature. (Spring)

7 **Music of Nonwestern Cultures** (3) Tilkens

Introductory survey of the basic systems and styles of music in the major cultures of the Eastern Hemisphere and Africa. (Fall)

8 **History of Jazz** (3) Staff

Introduction to the styles, composers, and performers of jazz music from its origins to the present. (Summer)

SECOND GROUP

103–4 **History of Music** (3–3) Tilkens

Development of music in the Western World from the early Christian Era to the present. (Academic year)

105 **Music of the Baroque Period** (3) Tilkens

Study of the musical styles, techniques, and literature from 1600 to 1750. (Spring)

106 **Music of the Classic Period** (3) Tilkens

Study of styles, techniques, and literature from the 18th century school through Haydn, Mozart, and Beethoven. (Fall)

107 **Music of the Romantic Period** (3) Staff

Study of the musical styles, backgrounds, and literature from Schubert through the 19th century. (Spring)

108 **Music of the 20th Century** (3) Steiner

The principal schools, techniques, developments, and trends of the 20th century.

109 **Orchestra Literature** (3) Steiner

Survey of the history and styles of orchestra literature, analysis of representative works.

110 **Chamber Music Literature** (3) Steiner

Survey of the history and styles of chamber music literature, analysis of representative works. (Fall)

121 **The Opera** (3) Staff

Survey of the history and styles of opera, analysis of representative works. (Spring)

125 **Keyboard Music Literature** (3) Tolson
Survey of the history, style, and major content of the keyboard literature from the 16th century to the present. (Spring)

173 **Piano Pedagogy** (3) Tolson
Principles, materials, and methods of piano teaching. (Fall)

199 **Independent Research** (3) Staff
Under the guidance of an assigned instructor. Open only to qualified Music majors. May be repeated for credit. (Fall and spring)

THIRD GROUP

203 **Bibliography and Research Methodology** (3) Staff
(Fall)

209 **History of Musical Instruments** (3) Steiner

234 **Seminar: Performance Practices in Selected Areas** (3) Staff

238 **Seminar: Analytical Studies in Music History** (3) Staff
Topic for 1976: Mahler. (Spring)

239 **Independent Research** (3) Staff

MUSIC THEORY

FIRST GROUP

1 **Elements of Music Theory** (3) Staff
Notation, scales, keys, intervals, terms, rhythms, and chord structure. (Fall and spring)

2 **Ear-training** (3) Staff
Melodic and harmonic dictation, ear-training, sight-singing, elementary keyboard harmony. (Spring)

5–6 **Harmony** (3–3) Parris
Triads, inversions; chord analysis, construction, and progression; part-writing, modulations, altered chords. Prerequisite: Mus 1 or satisfactory passing of placement examination. (Academic year)

SECOND GROUP

131–32 **Advanced Theory** (3–3) Parris and Staff
Practice in 18th century contrapuntal writing and analysis, chorale preludes, inventions, and fugues. Prerequisite: Mus 5–6 or equivalent. (Academic year)

135 **Counterpoint** (3) Parris
Study and practice of 16th century contrapuntal techniques. (Spring)

137 **Orchestration** (3) Parris
Instrumental scoring. (Fall)

138 **Form and Analysis** (3) Parris
Analysis of musical forms in representative musical literature. (Spring)

151 **Conducting** (3) Steiner
Technique of conducting, score reading, rehearsal procedures, analysis and interpretation of selected musical literature; practice in conducting (Spring)

THIRD GROUP

231–32 **Composition** (3–3) Parris and Staff
May be repeated for credit. (Academic year)

237 **Seminar: Analytical Studies in Music Theory** (3) Staff

251 **Advanced Conducting** (3) Steiner
(Spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

APPLIED MUSIC

All Applied Music courses may be repeated for credit.

All Applied Music courses are offered both fall and spring.

Mus 51, 52, 53, 54, and 55 do not include individual lessons and do not require a supplementary fee. All other Applied Music courses include individual lessons and require a supplementary fee, as follows:

1. One-semester-hour courses: individual lessons of ½ hour a week, supplementary fee, $75.
2. Three- or 6-semester-hour courses: individual lessons of 1 hour a week, supplementary fee, $100.

Supplementary fees for applied music courses are nonrefundable after the first 3 weeks of the fall and spring semesters. Supplementary fees are different for courses offered during the summer sessions. Consult the Department of Music for details.

The supplementary fee is waived for graduate degree candidates in music and full-time undergraduate music majors.

FIRST GROUP

Required practice: 3 hours a week for 1-semester-hour courses and 6 hours a week for 3-semester-hour courses. In addition, 3-semester-hour courses include assigned workshops in theory and performance.

11 **Piano** (1) Staff

12 **Piano** (3) Staff

13 **Voice** (1)	Prussing, J. White, Dash
14 **Voice** (3)	Prussing, J. White, Dash
15 **Organ** (1)	Scribner, McNabb, Dobry
16 **Organ** (3)	Scribner, McNabb, Dobry
17 **Violin** (1)	Steiner, Parnas
18 **Violin** (3)	Steiner, Parnas
19 **Classical Guitar** (1)	Norris, Raffaelle, Ferruzza
20 **Classical Guitar** (3)	Norris, Raffaelle, Ferruzza
21 **Viola** (1)	Parnas
22 **Viola** (3)	Parnas
23 **Cello** (1)	Martin, Jarvinen
24 **Cello** (3)	Martin, Jarvinen
25 **Bass** (1)	Irvine
26 **Bass** (3)	Irvine
27 **Flute** (1)	Perazzoli, Fuhrman
28 **Flute** (3)	Perazzoli, Fuhrman
29 **Recorder** (1)	Kraft, Lipnick
30 **Recorder** (3)	Kraft, Lipnick
31 **Oboe** (1)	R. White
32 **Oboe** (3)	R. White
33 **Clarinet** (1)	Wright
34 **Clarinet** (3)	Wright
35 **Saxophone** (1)	Wright
36 **Saxophone** (3)	Wright
37 **Bassoon** (1)	Lipnick, Maciejewicz
38 **Bassoon** (3)	Lipnick, Maciejewicz
39 **French Horn** (1)	Arsers, Ramsay
40 **French Horn** (3)	Arsers, Ramsay

41 **Trumpet** (1) Recke

42 **Trumpet** (3) Recke

43 **Trombone** (1) Kraft

44 **Trombone** (3) Kraft

45 **Percussion** (1) Wardlow

46 **Percussion** (3) Wardlow

47 **Harp** (1) Carmac

48 **Harp** (3) Carmac

51 **Orchestra** (1) Steine
Preparation and performance of orchestral literature. Prerequisite: audi tion before Director.

52 **Instrumental Ensemble** (2) Steine
Chamber ensemble groups in addition to orchestra participation.

53 **Chorus** (1) Prussing
Preparation and performance of choral literature. Prerequisite: auditio before Director.

54 **Chamber Choir** (2) Prussing
Small vocal groups in addition to chorus participation.

55 **Band** (1) Staf
Concert band, stage hand, and brass ensemble.

SECOND GROUP

Departmental prerequisite: Audition to meet departmental requirements.
Required practice: 6 hours a week for 1-semester-hour courses and 12 hours a week for 3-semester-hour courses. In addition, 3-semester-hour courses inclu master performance classes and recital preparation.

111 **Piano** (1) Sta

112 **Piano** (3) Sta

113 **Voice** (1) J. White, Do

114 **Voice** (3) J. White, Do

115 **Organ** (1) Scribner, McNabb, Dob

116 **Organ** (3) Scribner, McNabb, Dob

117 **Orchestral Instrument** (1) Sta

118 **Orchestral Instrument** (3) Sta

119 **Classical Guitar** (1) Staff

120 **Classical Guitar** (3) Staff

THIRD GROUP

Required practice: 12 hours a week for 3-semester-hour courses and 15 hours a week for 6-semester-hour courses. In addition, 6-semester-hour courses include supervised ensemble preparation and required concert solo performances.

211 **Piano** (3)

212 **Piano** (6)

213 **Voice** (3)

214 **Voice** (6)

215 **Organ** (3)

216 **Organ** (6)

217 **Orchestral Instrument** (3)

218 **Orchestral Instrument** (6)

Mycology—Graduate Study

The Graduate School of Arts and Sciences offers an interdisciplinary program leading to the degree of Master of Science in the field of Mycology. The program is directed by a committee whose members are drawn from several departments in the Graduate School.

Prerequisite: a bachelor's degree with a major in biology, botany, chemistry, or zoology from this University, or an equivalent degree. The undergraduate program should have included the following courses or their equivalents: BiSc 11–12 (*Introductory Biology for Science Majors*); Chem 11–12 (*General Chemistry*), 151–52 (*Organic Chemistry*), 153–54 (*Organic Chemistry Laboratory*).

Pathology

Professors F.N. Miller, Jr. (*Acting Chairman*), William Newman, B.H. Smith, Mary Matthews, Mario Werner (*Laboratory Medicine*), M.J. Valeske, Alexander Breslow, L.S. Lessin, Yousef Al-Doory

Clinical Professors L.E. Zimmerman (*Ophthalmic*), J.M. Blumberg, E.B. Helwig (*Dermatologic*), N.S. Irey, Robert Sauer (*Comparative*), Cornelia Hoch-Ligeti, J.L. Luke (*Forensic*), C.F. Bishop (*Laboratory Medicine*), R.S. Melville (*Laboratory Medicine*), R.A. Malmgren

Professorial Lecturers P.D. Olch (*History of Medicine*), Tatiana Antonovych

Associate Professors W.L. Marsh, F.S. Jannotta, W.A. Burns, R.B. Lingeman, Nirmal Saini, M.F. Dolan (*Hematology*), S.G. Kent, B.C. Zook (*Comparative*), Yousef Al-Doory

Associate Clinical Professors V.E. Martens, R.E. Palmer, W.J. Jaffurs, C.B. Cook, H.A. Schwamm, A.D. Cramer (*Blood Banking*), F.B. Johnson, H.J. Norris, Grace Guin

Assistant Professors Suzanne Hammersberg (*Medical Technology*), J.G Guccion, Jocelyn Hicks, F.P. Abramson (*Research*), Patsy Robinson (*Microbiology*), M.H. Fusillo (*Laboratory Medicine*), P.A. Lindsay, J.A. Zeller (*Laboratory Medicine*), J.F. Jemionek (*Clinical Chemistry*), E.W. Sutherland III

Assistant Clinical Professors W.F. Enos, Marjorie Williams, D.R. Parkinson, I.D. Godwin, F.M. Garner (*Comparative*), Gloria Brennan, F.R. Robinson (*Comparative*), J.W. Howell (*Clinical Chemistry*), B.D. Blackbourne (*Forensic*), M.B. Furlong, Jr. (*Laboratory Medicine*), B.J. Pearson (*Laboratory Medicine*), H.H. Berman, LeRoy Riddick (*Forensic*)

Clinical Instructors D.C. Hendrix (*Allied Health Science*), C.R. Lissner (*Clinical Microbiology*), M.L. Pratt (*Blood Banking*), Milo Prodanovich (*Clinical Chemistry*), H.A. Shulman (*Laboratory Medicine*), Linda Christoffersen (*Laboratory Medicine*), R.D. Hughes

Special Lecturers L.C. Johnson, R.S. Chandra, D.E. Blessing, E.C. Cager, T.D. Carpenter, C.C. Conboy, P.T. Geueke, E.E. Hogg, Hubert McWilliams, Celesta Miller, R.L. Peckham, J.H. Rollen, R.L. Santos, W.S. Slimak, J.W. Willets, Frederick Wright

Programs of study leading to the degrees of *Associate in Science (Medical Laboratory Techniques)* and *Bachelor of Science in Medical Technology* are described in the *School of Medicine and Health Sciences* catalogue.

Master of Science in the field of Anatomic Pathology.—Prerequisite: a Bachelor's degree from an accredited college or university. The undergraduate program should have included the following: (1) Biology—8 semester hours, including 4 hours of laboratory (this may be either in general biology or zoology but may not include separately credited courses in botany); (2) Chemistry—8 semester hours of general inorganic chemistry, including 4 semester hours of laboratory, and 6 semester hours of organic chemistry, including laboratory; (3) Physics—8 semester hours, including at least 2 hours of laboratory. Courses in embryology, microbiology, histology, genetics, and mathematics would also be useful.

Required: the general requirements, pages 93–100. The program of study consists of 45 semester hours of graduate work and must include the following: Anat 202, 203, 204, 205; Path 203-4, 205, 210, 215, 277, and 281.

Doctor of Philosophy in the field of Pathology.—Prerequisite: one of the following degrees from a recognized professional school: Doctor of Medicine (M.D.), Doctor of Veterinary Medicine (D.V.M.), or Doctor of Dentistry (D.D.S.). In exceptional cases, applicants with other backgrounds in the life sciences may be accepted.

Required: the general requirements, pages 93–97, 100–102, including 48 semester hours of approved graduate course work and a minimum of 24 semester hours of dissertation research. One year of experience in pathology at the University Hospital, equivalent to Path 283, may be counted for a maximum of 24 semester hours of graduate course work. Other experience must satisfy the eligibility requirements of the appropriate national certifying body, i.e., the American Board of Pathology in the case of the M.D., the American Board of Veterinary Pathology in the case of the D.V.M., and the American Board of Oral Pathology in the case of the D.D.S.

Research fields: Comparative Pathology, Human Pathology, Ophthalmic Pathology, and Veterinary Pathology.

203–4 **Pathology** (4–4) **Staff**

General introduction to concepts of disease. Pathology of organ systems; correlation with symptoms and physical signs. Gross and microscopic study of diseased tissues. Case studies. Limited enrollment. Prerequisite to Path 204: Path 203. (Academic year)

*205 **Comparative Pathology I** (3) **Zook**

An introduction to the study of disease in vertebrates, comparison with disease in man. Mechanisms by which various agents provoke illness; body defensive reactions. Illustration of common diseases of various species, including material from captive wild animals. Recommended: courses in anatomy, histology, and physiology. (Fall)

†210 **Comparative Pathology Laboratory** (2) **Zook**

Special assignments for discussion and study, including study of common diseases of captive wild animals. Path. Lab., Nat'l. Zoological Park. (Fall)

†215 **Perinatal Pathology Laboratory** (2) **Kent**

Special assignments for dissection and study. (Fall)

†266 **Comparative Pathology II** (1) **Zook**

Participation in an autopsy service involving wild animals in captivity and comparison of diseases in various animal species with those in man. Limited to 4 students. Path. Lab., Nat'l. Zoological Park. (Spring)

†277 **Anatomic Pathology Clerkship I** (arr.) **Staff**

A practical course in gross human anatomy and pathology. Prerequisite: Anat 201 or equivalent. Students may spend up to 24 weeks full-time on the necropsy and surgical pathology services, receiving 1 semester hour of credit for each 4-week period. Univ. and V.A. hosps. (Spring)

†281 **Anatomic Pathology Clerkship II** (arr.) **Staff**

A practical course in gross and microscopic human pathology. Prerequisite: Path 203–4 or equivalent. Students spend up to 24 weeks full-time, or the equivalent part-time, on the necropsy and surgical pathology services, receiving 1 semester hour of credit for each 4-week full-time period. Univ. and V.A. hosps. (Spring)

*283 **Anatomic Pathology Clerkship III** (arr.) **Staff**

Necropsy and surgical pathology service. Prerequisite: Path 203–4 or equivalent. Five semester hours of credit for each 4-week period. Students may receive up to 30 semester hours of credit for 6 months full-time. (Fall or spring)

*295 **Comparative Pathology III** (arr.) **Zook**

Participation in veterinary pathology service, including wild and domestic animals. Prerequisite: Path 203–4 or equivalent, Path 283. Five semester

* An interdepartmental course offered by the departments of Pathology and Biological Sciences.
† Open to limited number of graduate students, with permission.

hours of credit for each 4-week period. Students may receive up to 30 semester hours of credit for 6 months full-time. Path. Lab., Nat'l. Zoological Park, and Armed Forces Inst. of Path. (Fall or spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Pharmacology

Professors H.G. Mandel (*Chairman*), V.H. Cohn, Jr., Paul Mazel, E.B. Truitt, Jr. (*Research*), Roy Hertz (*Research*)
Professorial Lecturers F.E. Hahn, Julius Axelrod, Erminio Costa
Associate Professors J.A. Straw, Philip Klubes
Assistant Professors G.S. Edwards, F.P. Abramson (*Research*), H.C. Harder, J.W. Dailey, E.W. Sutherland III, Dominique Pessayre (*Research*), Mohammad Shahvari
Special Lecturer P.J. Creaven

Master of Science in the field of Pharmacology.—Prerequisite: a Bachelor of Arts or Bachelor of Science degree. The undergraduate program must have included the following courses, or equivalent: BiSc 11–12; Phys 1, 2; Chem 11–12, 22, 151–52, 153–54. One year of calculus and a course in physical chemistry are normally recommended but may be taken during the work toward the Master's degree.

Required: the general requirements, pages 93–100, including Bioc 221–22; Phsl 201; Phar 205–6, 299–300. The remaining courses may be selected from Bioc 224, 227, 232, 241, 252, 260, 266; Chem 156, 251–52, 257; Micr 211, 212, 225, 226, 230, 233, 257, 258; Phar 254, 256, 267, 269, 272, 275–76, 277–78, 279, 281, 282, 283, 295.

Doctor of Philosophy in the field of Pharmacology.—Required: the general requirements pages 93–97, 100–102.

Research fields: Biochemical Pharmacology, Cancer Chemotherapy, Carcinogenesis, Developmental Pharmacology, Endocrine Pharmacology, Molecular Pharmacology, Neuropharmacology, Pharmacology of Drug Abuse, and Physiological Disposition of Drugs.

115 **Drug Abuse Education** (3) Cohn and Staff
Psychological and sociological bases of drug abuse, pharmacological and toxicological aspects of drug action on both the brain and peripheral organ systems, legal and societal implications of and reactions to drug abuse. Lectures and discussions on alcohol, narcotics, central nervous system stimulants and depressants, marijuana and other hallucinogenic and psychedelic drugs. (Fall and spring)

203 **Fundamental Principles of Pharmacology** (2) Cohn and Staff

Basic principles of pharmacology, including drug receptor interactions, structure activity relationship, pharmacokinetics, membrane phenomena, cellular control mechanisms, drug toxicity. (Fall)

205–6 **Pharmacology** (4–4) Klubes and Staff

Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis of rational therapy of disease. Prerequisite: biochemistry and physiology, or approval of Department. Prerequisite to Phar 206: Phar 205. (Academic year)

215 **Adolescent Drug Abuse** (3 or 4) Cohn and Staff

Offered off campus through the College of General Studies. Primarily for teachers, counselors, and school administrators. Multidisciplinary lectures and discussions concerning the physiological and psychological effects of narcotics, central nervous system stimulants and depressants, alcohol, and hallucinogenic and psychedelic drugs; psychosocial factors leading to adolescent drug abuse; legal implications of drug abuse; prevention, control, and treatment of drug abuse. (Fall and spring)

216 **Drug Abuse Education Techniques** (3) Cohn and Staff

Offered off campus through the College of General Studies. Primarily for teachers and counselors preparing to direct teacher and parent drug abuse education programs. Intensive review of current information on drug abuse, dynamics of group process, supervised practical experience. Prerequisite: Phar 215 and permission of instructor.

252 **Seminar: Clinical Pharmacology** (2) Staff

Principles of experimental design for the evaluation of drug efficacy and safety in man. Problems in therapeutics: emphasis on drugs used in treatment of cardiovascular and infectious diseases. Enrollment limited. (Spring 1976 and alternate springs)

254 **Frontiers in Pharmacology** (1) Mazel and Staff

Recent advances and fields of research in pharmacology. Presentations by laboratory scientists from neighboring institutions. (Spring)

256 **Molecular Pharmacology** (2) Hahn

Current theory on action of drugs, especially chemotherapeutic agents, at molecular level. Effect of drugs on biosynthetic processes of the cell with respect to DNA, messenger RNA, transfer RNA, ribosomes, protein, cell wall, and intermediary metabolites. Factors which alter action of drugs, such as drug interactions and resistance. (Spring)

258 **Cancer Chemotherapy** (1) Mandel and Staff

Mechanisms by which drugs inhibit the growth of tumor cells. (Spring 1976 and alternate springs)

259 **Developmental Pharmacology** (1) Staff

Lectures, seminars, conferences. Teratogenic actions of drugs; pharmacological principles which apply during prenatal and perinatal development. (Spring 1976 and alternate springs)

260 **Endocrine Pharmacology** (1) Hertz and Staff

Lectures and seminars on recent advances in the pharmacology and mechanisms of action of various hormones. (Spring 1977 and alternate springs)

267 **Pharmacological Research** (arr.) Staff

Research with staff members. May be repeated once for credit toward a Master of Science degree. (Fall and spring)

269 **Pharmacology Seminar** (1) Mazel and Staff

Recent advances in pharmacology. Content differs each time the course is offered; may be repeated once for credit. (Fall and spring)

272 **Physiological Disposition of Drugs** (3) Cohn

Fate of drugs in biological tissue. Absorption, distribution, chemical alteration, excretion of drugs; physical, chemical, and biological factors affecting these processes. Prerequisite: Phar 205–6 or equivalent. (Spring 1976 and alternate springs)

275–76 **Advanced Topics in Pharmacology I-II** (1–1) Klubes and Staff

Lectures and seminars on advances in mechanisms of drug action, pharmacology of new drugs, theoretical aspects of pharmacology, laboratory techniques. (Academic year 1975–76 and alternate years)

277–78 **Advanced Topics in Pharmacology III-IV** (1–1) Klubes and Staff

Continuation of Phar 275–76. (Academic year 1976–77 and alternate years)

279 **Special Topics in Pharmacology** (arr.) Costa, Hertz

Selected aspects of drug action. Content differs each time the course is offered; may be repeated once for credit. (Fall and spring)

281 **Physiological Techniques in Pharmacology—Lecture** (2) Mazel, Straw

Physiological techniques for obtaining information on mechanism and site of action of pharmacological agents. Phar 281 may be taken without 282. Prerequisite: Phar 205–6 or equivalent. (Spring 1976 and alternate springs)

282 **Physiological Techniques in Pharmacology—Laboratory** (2) Mazel, Straw

Accompanies Phar 281. Prerequisite: Phar 205–6 or equivalent. Prerequisite or concurrent registration: Phar 281. (Spring 1976 and alternate springs)

283 **Biochemical Techniques in Pharmacology** (arr.) Edwards, Cohn

Lecture and laboratory. Theory and practice of modern biochemical techniques applicable to study of metabolic fate and mechanism of action of drugs. Prerequisite: Phar 205–6 or equivalent. (Fall or spring)

295 **Reading and Research** (arr.) Staff

Independent study for students preparing for the Master of Science degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research (3–3)** Staff
(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research (arr.)** Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Philosophy

Professors Thelma Z. Lavine (*Chairman*), R.H. Schlagel
Associate Professors C.H. Pfuntner, W.B. Griffith, R.S. French

Bachelor of Arts with a major in Philosophy (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirements for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)
2. Required courses in related areas—6 semester hours of literature courses selected from Chinese, Classics, English, French, German, Italian, Slavic, or Spanish (Clas 71, 72, or Engl 91–92 recommended); 6 hours selected from Art History, Music History and Literature, or Religion; 6 hours in History (Hist 39–40 recommended).
3. Required courses in the major—Phil 111, 112, 113; 9 semester hours selected from Phil 121, 131, 151, 152; 6 semester hours selected from Phil 172, 192, 193; plus 6 additional semester hours of second-group Philosophy courses.

For students expecting to continue in graduate school, it is recommended that they include in their program of study 12 semester hours of introductory French, German, or Greek language courses.

Master of Arts in the field of Philosophy.—Prerequisite: a Bachelor's degree with an undergraduate major in Philosophy at this University, or an equivalent degree. The undergraduate program should have included the following courses or their equivalent: Phil 111, 112, 113, 121, 131, and 152.

Required: the general requirements, pages 93–100. The program of study consists of a minimum of 30 semester hours of second- and third-group courses with or without a thesis. A Master's Comprehensive Examination is required in two areas of philosophy: the History of Philosophy; Problems of Philosophy and Contemporary Philosophy.

Master of Arts in Special Studies with an area of concentration in Philosophy and Social Policy.—An interdisciplinary program which brings the normative, historical, and analytical-logical skills of philosophical inquiry to bear upon contemporary problems of social policy. Prerequisite: a Bachelor's degree from an accredited college or university. Students are expected to have completed the prerequisites to graduate courses.

Required: the general requirements, pages 93–100. The program of study consists of 36 semester hours with or without a thesis, including a plurality of approved courses in the Arts and Sciences with no more than one-third from any one department. Phil 195, 198, 231, and 272 are required. Courses may also be selected

from the School of Education, the School of Government and Business Administration, and the National Law Center. All candidates are required to pass a Master's Comprehensive Examination. Prospective candidates should consult Professor Roderick French, director of the program, regarding specific requirements and the selection of courses outside the Department of Philosophy.

FIRST GROUP

50 **Introduction to Philosophy** (3) — Staff
Readings from major philosophers and study of philosophic positions from Plato to the present. (Fall and spring)

71 **Philosophy and Literature** (3) — Lavine
Philosophical foundations of psychoanalytical psychiatry, existentialism, and Marxism and their expression in literature, e.g., in the works of Mann, Kafka, Camus, Sartre, Hesse, Gide, and Koestler. (Spring)

SECOND GROUP

101 **Logic, Scientific Inference, and Legal Argument** (3) — Griffith
Analysis of some main patterns of argument, including deductive, scientific (inductive, probabilistic), and legal; emphasis on concrete examples.

111 **History of Ancient Philosophy** (3) — Pfuntner
History of Western philosophy from early Greece to the early Middle Ages. (Fall)

112 **History of Modern Philosophy** (3) — Staff
History of Western philosophy of the 17th and 18th centuries (Descartes to Kant). (Spring)

113 **19th Century Philosophy** (3) — Lavine
European philosophy from Kant to German Romanticism, Fichte, Hegel, Kierkegaard, Schopenhauer, and Nietzsche. (Fall)

121 **Introduction to Symbolic Logic** (3) — Griffith
Systematic study of the principles of valid inference with attention to the development of skill in logical analysis and evaluation of arguments, and to the elementary theory of formal systems. (Fall)

*127 **Theories of History** (3) — Lavine
Major philosophies of history: Judeo-Christian, linear progress, historicism, Hegelian-Marxian dialectic, cyclical (Vico, Spengler, Toynbee) and social-scientific (Comte, Weber) views. Contemporary problems of historical knowledge. (Fall)

131 **Ethics** (3) — Griffith (Spring)
Theories of the "good" and "the right" from Plato to Sartre.

* An interdepartmental course offered by the departments of Philosophy and History.

132 **Social Philosophy** (3) Lavine

Social philosophies from Locke to contemporary theorists. (Spring)

142 **Philosophy of Law** (3)

Systematic examination of the fundamental concepts of law and jurisprudence; special emphasis on their treatment by contemporary philosophers and jurists.

151 **Myth, Science, and the Modern Mind** (3) Schlagel

Comparison of the mythical and scientific outlook; emphasis on the development and nature of scientific concepts, methodology, and explanation from Copernicus to Einstein. (Fall)

152 **Knowledge, Truth, and Reality** (3) Schlagel

Inquiry into the basis and structure of knowledge, the problem of perception and independent reality, and the meaning and criteria of truth. (Spring)

162 **Aesthetics** (3) Pfuntner

Nature of aesthetic experience, problems of appreciation and criticism in the arts, and theories of artistic creation. Emphasis on contemporary arts and criticism. (Spring)

163 **Philosophy and the Film** (3) Pfuntner

Examination of aesthetic theories in relation to the film as most familiar and most powerful of 20th century art forms. Readings in aesthetic theory and film criticism. Viewing and critique of about eight films.

172 **American Philosophy** (3) Pfuntner

Philosophies of Peirce, Royce, James, Dewey, and Santayana as representatives of American thought. (Fall)

182 **Philosophical Foundations of Psychology** (3) Staff

The philosophical significance of psychology as a modern science focusing on the conflicts between (1) gestalt and classical psychology and (2) phenomenological and behavioristic psychology.

192 **Contemporary Philosophy: Analytical** (3) Schlagel

The two dominant movements of recent Anglo-American philosophy, logical positivism and British ordinary language philosophy, as represented by Russell, G. E. Moore, Wittgenstein, Ryle, Ayer, etc. (Fall)

193 **Contemporary Philosophy: Phenomenological** (3) Staff

The phenomenological movement, including its development into German and French existentialism, and its more recent phases. (Fall)

195 **Man and Nature in Public Policy** (3) French

Relation of philosophical conceptions of man and nature to national policies of growth and development in selected periods of American history. (Fall)

198 **Philosophy of the Social Sciences** (3) Lavi
Philosophic issues relating to theory, methodology, and application of th
social sciences, with exemplification in one major contemporary socia
scientific project. (Spring)

THIRD GROUP

201–2 **Readings and Research** (3–3) Staf
Advanced readings and reports. Investigation of special problems.
(Academic year)

216 **Seminar: Kant** (3) Schlage
Critique of Pure Reason.

221 **Seminar: Logical Theory** (3) Griffith
Metatheory of deductive systems, modal logics; historical and philosophi
cal import of recent developments.

231 **Ethics and Economic Policy: Justice and Equality** (3) Griffith
Economic policy viewed from the perspectives of ethical and economic
theories with special focus upon the issue of income distribution in the
United States. (Fall)

251 **Seminar: Philosophy of Science** (3) Schlagel
Intensive study of selected problems in the historical and theoretical foun
dations of science.

252 **Seminar: Epistemology** (3) Schlagel
Study of selected problems.

272 **Pragmatic Naturalism and American Social Policy** (3) Pfuntner
Examination of pragmatic naturalism as a criticism and reconstruction of
American institutions. Evaluation of current philosophical and theological
alternatives to naturalism in the face of current technological and eco-
logical problems. (Spring) Staff

299–300 **Thesis Research** (3–3)
(Fall and spring)

Physical Science

See "Chemistry."

Physics

Professors G.M. Koehl (*Emeritus*), H.H. Hobbs (*Chairman*), Julian Eisenstein
Otto Bergmann, A.J. Zuchelli, Francisco Prats
Associate Professor W.C. Parke

Assistant Professors N.K. Khatcheressian, M.F. Taragin, D.R. Lehman, D.D. Thornton

Bachelor of Arts or Bachelor of Science with a major in Physics (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—Phys 1, 2, 31–32; Chem 11–12; Math 31, 32, 33.
3. Required course in related area—Stat 97 or EE 51.
4. Required courses in the major—Phys 151–52, 161, 162, 163, 164, 165–66, 167, 168.

Master of Arts in the field of Physics.—Prerequisite: a Bachelor's degree with a major in Physics at this University, or an equivalent degree.

Required: the general requirements, pages 93–100, including Phys 231, 232, 233–34, 235, 236, 299–300, plus *one* of the following: Phys 241, 243, 244, 245, or 251–52.

A reading knowledge of a foreign language, or the successful completion of Stat 197, with a grade of *A* or *B*, is required.

Doctor of Philosophy in the field of Physics.—Required: the general requirements, pages 93–97, 100–102, and the successful completion of one of the two following tool requirement options: (a) two foreign language reading examinations or (b) one foreign language reading examination and completion of Stat 197 with a grade of *A* or *B*.

Research fields: Experimental Solid State Physics (Electrical Conductivity of Solids, Defects in Crystals, Magnetic Properties of Solids at Low Temperatures, Magnetic Resonance, Mössbauer Effect, Superconductivity), and Theoretical Physics (Elementary Particles, Field Theory, General Relativity, Magnetic and Optical Properties of Solids, Molecular Structure, Nuclear and Photonuclear Reactions).

Bachelor of Arts in Education with a teaching field in Physics.—Prerequisite: the Education curriculum page 79.

Required: the Physics option and the professional courses listed on pages 118, 120–21.

Departmental Prerequisite: Phys 1–2 and two semesters of calculus or equivalent, and consent of a departmental adviser, are prerequisite to all second-group courses.

Undergraduate departmental advisers: W. Parke, D. Lehman.

Graduate departmental advisers: J. Eisenstein, O. Bergmann, A. J. Zuchelli, F. Prats.

ASTRONOMY

FIRST GROUP

9–10 **Introduction to Astronomy** (3–3) Hobbs

Lecture (2 hours), recitation (1 hour), laboratory (2 hours). Classical through modern astronomy with introduction to basic principles underlying astronomical systems and observations. Primarily for nonscience majors. Laboratory fee, $11 a semester. (Academic year)

*11–12 **Introduction to Astronomy** (2–2) Hobbs

Same as Phys 9–10 without the laboratory. (Academic year)

21 **Modern Cosmology** (3) Staff

Nonmathematical treatment of cosmology and related subjects from astronomy and physics. Quasars, peculiar galaxies, pulsars, black holes, antimatter, etc. Prerequisite: Phys 10 or 12.

* This course may not be taken by students who have completed, or are enrolled in, or plan to enroll in Phys 9–10.

PHYSICS

FIRST GROUP

1 Foundations of Physics (4) Par

(Formerly General Physics)

Development of conceptual principles underlying modern physical kno edge; basics of mechanics, heat and electromagnetism, including the cl sical concepts of energy, momentum, heat, temperature, entropy, elec and magnetic fields, optics. Prerequisite: two years of college prepara mathematics or concurrent registration in Math 6. Laboratory fee, $1

2 Introduction to Modern Physics (4) Zuche

Topics focusing upon present understanding of the physical universe a character of the atomic and subatomic worlds. Includes considerations length and time in relativity theory, present understanding of gravitat wave-particle duality, quantum theory, nuclei, subnuclear particles. P requisite: Phys 1 or equivalent. Laboratory fee, $11.

***3 Foundations of Physics** (3) Par

Same as Phys 1 without laboratory. (Fall and spring)

†4 Introduction to Modern Physics (3) Zuche

Same as Phys 2 without laboratory. (Fall and spring)

6 Energy and the Environment (3) Lehm

(Formerly Energy and the Environment: from Lightning to Thermonuclear Power)

Consideration of man's energy resources and their utilizational impact the environment from a physical viewpoint. Topics include: man's ene resources, the demand for energy, the cost of energy, nuclear fissi radiation hazard to man, pollution due to energy sources, transportatio energy and waste, and energy converters. Prerequisite: high school alge

7 Ideas of Physics—History and Analysis (3) Bergm

The development of atomic theory and corresponding views of space a time are discussed. Physical phenomena which were relevant to the e lution of the atomic theory are treated in historical perspective. P requisite: high school algebra.

27–28 Physics in Medicine (3–3) Par

Principles of physics applied to biological systems and to medical instr mentation, including ultrasonics, circulation dynamics, bioenergetics, opt in medicine, applications of IR and UV radiation, medical transduce particle radiation in medicine, models of the brain, molecular biophysi Prerequisite: Phys 2 or equivalent. (Academic year)

31–32 Introduction to Theoretical Physics (3–3) Lehm

Theoretical structure of physics, emphasis on appropriate analytical te

* This course may not be taken by students who have completed, or are enrolled in, or plan to roll in Phys 1.

† This course may not be taken by students who have completed, or are enrolled in, or plan to roll in Phys 2.

niques. Prerequisite: two semesters of calculus and Phys 2. (Academic year)

SECOND GROUP

151–52 **Intermediate Research** Taragin

Independent advanced work to introduce students to research techniques and use of specialized instruments. Laboratory fee, $11 a semester. (Academic year)

161 **Mechanics I** (3) Prats

Mechanics of mass points and rigid bodies. Newton's laws, conservation laws, Euler's equations, inertia tensor, small vibrations, and elements of Lagrange's and Hamilton's equations. (Fall 1976 and alternate falls)

162 **Mechanics II** (3) Zuchelli, Khatcheressian

Basic aspect of continua, including elasticity and fluid dynamics, strain tensor, stress tensor, equations of equilibrium, elastic waves, ideal and viscous fluids.

163 **Physical and Quantum Optics** (3) Eisenstein, Hobbs

Oscillations and waves, energy and momentum of the electromagnetic field, interference, diffraction, geometrical optics, optics of crystals and other media, dispersion. (Fall 1975 and alternate falls)

164 **Thermodynamics** (3) Khatcheressian, Thornton

Principles of equilibrium thermodynamics, reversible processes, thermodynamic potentials, stability and phase changes, applications.

165–66 **Electromagnetic Theory** (3–3) Prats, Taragin

Development of Maxwell's field equations using vector and tensor calculus, electrostatics, stationary and nonstationary phenomena, basic circuit theory, electromagnetic waves and radiation.

167 **Principles of Quantum Physics** (3) Bergmann, Zuchelli

Development of logical structure and experimental bases for modern quantum mechanics. Simple examples worked out to clarify the structure; primary emphasis on conceptual framework and its mathematical realization; careful consideration of the laboratory results to which the theory is a response.

168 **Applied Quantum Physics** (3) Zuchelli, Parke

Explicit applications of principles of quantum mechanics to a variety of problems in atomic, molecular and nuclear physics. Quantum statistical mechanics developed with applications in solid state. Emphasis on explicit evaluation of solutions and the techniques required. Prerequisite: Physics 167 or equivalent.

170 **Elementary Solid State Physics** (3) Thornton, Khatcheressian

Structure of solids, lattices and lattice defects, deformation, vibrational and electronic contribution to specific heats, binding energies electronic states in metals and semiconductors, magnetic properties of solids. Elementary methods required such as quantum mechanics and normal mode expansions are developed as needed.

175 **Nuclear Physics** (3) Lehman, P

Introduction to application of quantum physics in the description of nu and their interactions. Properties of nuclei, nuclear models, nuclear for and nuclear reactions are considered. Specific topics include the deute n-p scattering, the optical model, the shell model, the liquid-drop mo beta-decay, fission, and fusion. Prerequisite: Physics 167 or permissio instructor.

THIRD GROUP

Consent of a departmental graduate adviser is required for admission to all th group courses in Physics.

231 **Electromagnetic Theory: Macroscopic Effects** (3) Eisenst

Detailed consideration of classical electromagnetic field theory in vacu and in electrically and magnetically active media. Boundary-value pr lems, multipole expansions, induced polarizations, time-dependent fie frame dependence of the fields, gauge transformations, radiation fields

232 **Advanced Mechanics** (3) Zuch

Analytic methods of mechanics as a basis for modern theory: variatio principles, Lagrange's equations, Hamiltonian formulation, canonical tra formations, classical perturbation theory.

233–34 **Quantum Mechanics** (3–3) Prats, Thorn

General aspects of quantum mechanics with emphasis upon the deve mental principles involved. Operators, representations and transforma theory, Schrodinger and Heisenberg pictures, angular momentum, per bation theory, scattering theory. (Academic year)

235 **Special Relativity** (3) Bergm

Application of relativistic concepts to the basic fields of physics: spa and time, tensors and covariant mechanics of point particles, covar form of electromagnetism, relativistic variational principles, relativ quantum equations.

236 **Electromagnetic Theory: Electrodynamics and Radiative Effects** (3) Bergmann, Eisens

Analysis of problems involved in obtaining the motion of charges given electromagnetic fields and radiation from such charges. Covari methods developed and used where suitable. Specific topics include ra ation by moving charges, spectral decomposition and integrated flux, ang lar distribution of radiation, radiation reaction and anomalies.

241 **Statistical Mechanics** (3) Lehman, Bergm

Study of classical and quantum equilibrium statistical mechanics. Kine theory and transport phenomena reviewed prior to examining principles statistical mechanics. Among topics considered: distribution functio H-theorems, partition functions, Gibb's paradox, canonical ensemble, gra canonical ensemble, ideal gases, interacting gases, cluster expansion, vi expansion, and density matrices.

242 **Atomic and Molecular Structure** (3) Bergm

Structure of atoms and molecules, energy levels, binding energy, opti

activity. Hartree and Hartree-Fock equations spin-effects, rotational and vibrational effects, para-magnetic resonance, chemical binding.

243 **Solid State Physics: Structure and Binding** (3) Khatcheressian, Hobbs, Taragin

Atomic structure of solids and analysis of the binding of crystals. Crystalline forms and symmetries, atomic vibrations and specific heats, sound and optical propagation, crystalline defects.

244 **Solid State Physics: Electronic Processes in Metals** (3) Khatcheressian, Eisenstein, Thornton

Phenomena in metals and semi-conductors determined by the electronic states allowed: binding, specific heats, magnetic properties, transport phenomena. Independent particle approximation and many-body aspects are discussed.

245 **Quantum Electrodynamics: Theory and Applications** (3) Zuchelli

A presentation of the lower order effects depending upon the quantal nature of the electromagnetic field: Hamiltonian formulation and field quantization, perturbation calculations, Compton effect, photoelectric effect, electron-electron scattering, pair creation and annihilation, indices of refraction, divergence difficulties.

246 **Quantum Field Theory** (3) Bergmann

Covariant presentation of general theory of quantized fields, Boson and Fermion fields, theory of S-matrix, dispersion relations, and renormalization program.

247 **Nuclear Theory** (3) Prats, Lehman

Nuclear interactions, nuclear models, theory of nuclear reactions, pion physics and weak interactions.

248 **Elementary Particles** (3) Parke

Experimental properties and present theoretical understanding of subnuclear particles; applied S-matrix formalism; symmetry principles; unified models, and theories of weak, electromagnetic, and strong interactions.

249 **Statistical Processes** (3) Zuchelli

Analysis of problems involved in understanding and predicting the approach to equilibrium of a complex system within the classical context, as exemplified by rare or dense gases, ionized gases, or plasmas. Specific topics include: Liouville equation, ergodic theory, Boltzmann equation, Boltzmann-Vlasov equation, Chapman-Enskog theory, Bogoliubov time scales, Prigogine type formalism, convergence questions.

250 **Selected Topics in Modern Physics** (3) Staff

Complements the established curriculum by affording formal instruction in topics of immediate interest to the development of physics and in particular to the members of the graduate research group. May be repeated for credit with permission of graduate adviser. (Fall and spring)

251–52 **Laboratory** (3–3) Staff

Individual work on special topics. Laboratory fee, $11 a semester. (Academic year)

254 **General Theory of Relativity** (3) Bergmann

Physical principles and mathematical methods underlying Einstein's field equation, geodesic equations of motion, checks of the theory, action principle, conservation laws, perturbation theory, gravitational radiation theory, relativistic cosmology. (Spring 1976 and alternate springs)

291 **Seminar** (1) Staff

Lectures on special problems in physics. May be repeated once for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated once for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Physiology

Professors C.S. Tidball, R.A. Kenney (*Chairman*), Elizabeth Tidball, Marie Cassidy

Associate Professors M.J. Jackson, Michael McCally, R.A. Lavine, D.W. Watkins

Assistant Professor Mary McCrea (*Research*)

Assistant Professorial Lecturers I.P. Weiss, E.A. Steane

Special Lecturer L.L. Langley

Master of Science in the field of Physiology.—Prerequisite: a Bachelor's degree. No major is specified, but the undergraduate program must have included the following courses or equivalent: BiSc 11–12; Chem 11–12, 22, 151–52, 153–54; Math 31; Phys 1, 2.

Required: the general requirements, pages 93–100. In addition to the thesis, the 30 hours of required work should include Phyl 201, 221, 298, and at least 3 semester hours of research (Phyl 295).

Doctor of Philosophy in the field of Physiology.—Required: the general requirements, pages 93–97, 100–102. The program of study includes a major field in Physiology, a subfield (see below) in Physiology and a minor field outside of Physiology leading to the Cumulative Examination. The 48 semester hours of required course work leading to the Cumulative Examination should include Bioc 221–22; Phyl 201, 221, 298, 396, 397; and a minimum of 8 semester hours each in two areas outside of Physiology in addition to the minor field.

Research fields and areas of study: Applied Physiology, Cardiovascular Physiology, Cellular Physiology, Endocrine Physiology, Gastrointestinal Physiology, Neurophysiology, Renal Physiology, and Respiratory Physiology.

Departmental prerequisite: Phyl 201 or equivalent is prerequisite to all courses in Physiology numbered above 201.

191 **Selected Topics in Human Structure and Function** (3) Kenney

Lecture (2 hours), laboratory (1 hour). Structural and functional basis of physiology. A required course for graduate students who have not had Anat 201 or equivalent. An undergraduate course; students may receive graduate credit on completion of additional work as prescribed by the instructor. Prerequisite: BiSc 11–12 or equivalent and consent of instructor. Open to Columbian College of Arts and Sciences students with the approval of the student's major adviser. (Fall)

201 **Physiology** (8) Staff

Lecture (8 hours), laboratory (2 hours), conference (1 hour). Cellular, organ system, and applied mammalian physiology. Prerequisite for graduate students: Anat 201 or Phyl 191, or equivalent; Bioc 201 or 221–22 (Bioc 222 may be taken concurrently); or consent of Chairman of Department. Open to Consortium students only with permission of Department Chairman. (Spring)

211 **Cell Biology** (2) (Same as Anat 211) Staff

An integrated survey of the structure, function, and metabolism of the cell, as an introduction to the medical sciences.

212 **Neurobiology** (3) (Same as Anat 212) Staff

An integrated survey of the structure and function of the human nervous system; lecture, clinical demonstrations, and laboratory. Laboratory fee, $25.

221 **Seminar** (1) Cassidy

Staff and student presentations from literature. Present work discussed, experimental design and scientific deduction evaluated. Topics to be announced. Prerequisite: a reading knowledge of French or German. Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

251 **History of Medicine** (1) E. Tidball

Survey of the great contributors to physiology and medicine in the context of the times in which they lived and worked. (Fall)

252 **Physiological Basis of Sexuality** (2) C. Tidball, E. Tidball

Conference and discussion on topics including communication, psychosexual development, physiological responses, homosexuality, population control and family planning, fertility and sterility, etc. (Fall)

253 **Physiology of Fluid Balance and Hydrogen Ion Regulation** (2) Cassidy

Discussion on principles of fluid and acid-base balance and the application of these principles to scientific situations. (Fall)

261 **Gastrointestinal Physiology** (1 or 2) Jackson, Dobbins*

Weekly seminar; role of basic sciences in gastroenterology; intra- and

* Dr. W.O. Dobbins III is Professor of Medicine, School of Medicine and Health Sciences.

extra-mural speakers. An approved paper required for 2 semester hours of credit. May be repeated for credit. (Fall and spring)

262 **Topics in Cardiovascular Physiology** (2) Kenney

Survey, at an advanced level, of aspects of cardiovascular physiology especially as interrelated with the respiratory and renal systems. (Fall

265 **Review of Endocrinology** (1) Jackson

Review of basic endocrinology. (Fall)

266 **Advanced Endocrinology** (2) Jackson

Review at advanced level of selected topics in endocrinology and metabolism. Concurrent registration in Phyl 265 required. (Fall)

267 **Renal Physiology** (2) Kenney

Lecture or conference 2 hours a week. Overview of renal physiology at advanced level.

268 **Computer Utilization in Physiology and Medicine** (2) C. Tidbal

Lecture 1 hour a week, practical experience at student's convenience. Orientation to digital and analog mini-computers. Programming in several languages. Experience with one or more computers. No previous computer experience necessary. (Fall)

269 **Topics in Neurophysiology and Psychophysiology** (2) Lavine

Selected topics in contemporary neurophysiology, including methods of data collection and analysis, control mechanisms involved in movement and behavior and sensory processing. Open to students in the School of Engineering and Applied Science with permission of instructor. (Fall)

295 **Research** (arr.) Staff

By special arrangement with individual Staff members. Approximately 4 clock hours in the laboratory for each semester hour of credit. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

298 **Comprehensive Physiology** (arr.) Staff

Guided review of selected areas of Physiology appropriate to the student's graduate program. This course satisfies the requirements for the Master's Comprehensive Examination, the Field Examination for doctoral students minoring in Physiology, and Part I of the Cumulative General Examination. Prerequisite or concurrent registration: Phyl 221. (Fall)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

396 **Advanced Reading and Research** (2) Staff

Limited to students preparing for the Doctor of Philosophy general examination. Tutorial literature survey of a subfield of Physiology and of pertinent areas of the candidate's minor field. This course satisfies the requirement for Part II of the Cumulative General Examination in Physiology. (Fall and spring)

397 **Development of Dissertation Problem** (2) **Staff**

Limited to students preparing for the Doctor of Philosophy general examination. Preparation for written and oral presentation of dissertation problems. This course satisfies the requirement for Part III of the Cumulative General Examination in Physiology. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Polish

See "Slavic Languages and Literatures."

Political Science

Professors R.E. Purcell, H.L. LeBlanc (*Chairman*), Benjamin Nimer, Andrew Gyorgy, H.C. Hinton, B.M. Sapin, J.A. Morgan, Jr.
Associate Professors C.F. Elliott, Bernard Reich, Young Kim, C.A. Linden, S.J. Wayne, J.M. Logsdon
Adjunct Associate Professor Donald Robinson
Assistant Professors R.E. Darcy, J.M. Starrels, S.W. Burks, H.R. Nau, R.L. Cole, Dana Fischer, E.R. Declercq (*Visiting*)
Associate Professorial Lecturer James Francis Clark Hyde, Jr.

Bachelor of Arts with a major in Political Science (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—PSc 4 and 6 or 5 and 6; Stat 51 or 53. (12 semester hours of introductory foreign language courses are recommended for students interested in political theory, comparative government, or international relations.)
3. Required courses in related areas—18 semester hours of social studies other than Political Science, including 6 hours of either Economics or History.
4. Required courses in the major—30 semester hours of second-group Political Science courses which must include 6 semester hours from each of Groups A, B, C, and D listed below. The 6 hours from Group A must include PSc 105 (which should be taken no later than the second semester of the junior year); the 6 hours from Group B must include PSc 103 or 104 or 122 or 145; the 6 hours from Group C must include PSc 111 or 112; the 6 hours from Group D must include PSc 171 or 172 or 181.

Group A: Political Theory and Methodology—PSc 105, 107, 117–18, 119–20, 160; *Group B:* American Government and Politics—PSc 103, 104, 106, 108, 122, 125, 126, 145, 146, 149, 150, 151, 167, 183–84, 185–86, 199, SPSc 154, 5; *Group C:* Comparative and Foreign Government and Politics—PSc 101, 111, 2, 115, 162, 163, 177, 180, 190, 191, 192, 193, 194; *Group D:* International litics, Law, and Organization—PSc 171, 172, 178, 179, 181, 189, 197.

A student majoring in Political Science may not credit more than 12 hours of per Service-Learning courses or internships with their associated seminars toward degree; no more than 6 hours of such courses may be credited toward the major.

Students in the 90-semester-hour degree program (see page 86) must rec
grades of *A* in at least 18 semester hours of second-group Political Science cou
Political Science majors may apply for graduation with Special Honors. In o
to be recommended by the Department for Special Honors, students must fulfill
general requirements (see pages 50–51) and must complete with distinction a pro
of independent study, as demonstrated in a written paper, in addition to the nor
credit requirements of particular courses. A committee of the Department will
view the paper and make the recommendation for Special Honors.

Students who wish to undertake independent study for Special Honors should
ister with the secretary of the Department *no later than the second week of t*
semester, and then consult with a member of the Department whose specialized in
ests lie in the area of the proposed research project. Students registered for
150 may qualify for graduation with Special Honors by completing with distinc
the work connected with their internship.

Master of Arts in the field of Political Science.—Prerequisite: a Bachelor's deg
with a major in Political Science from an accredited college or university (or
equivalent degree), with high scholastic standing.

Required: the general requirements, pages 93–100, including a reading knowle
of a modern foreign language or a specified level of knowledge in statistics.
choice of the foreign language, or of statistics in lieu of a language, must be m
with the approval of the Department. With the approval of the Department, stud
may elect one of the following programs: (1) 24 semester hours of graduate co
work plus a thesis (equivalent to 6 semester hours) and the satisfactory comple
of a Master's Comprehensive Examination in three fields of political science (selec
from the areas of study listed below under the Ph.D. program); or (2) 33 semes
hours of graduate course work, including two research seminars (equivalent
semester hours) without a thesis and the satisfactory completion of a Master's C
prehensive Examination in four fields of political science (selected from the a
of study listed below under the Ph.D. program).

Students in either the 30- or 33-semester-hour program must include in
program of study PSc 201 during the first semester of graduate study unless
waiver examination they can demonstrate equivalent knowledge of the sub
matter of the course.

Doctor of Philosophy in the field of Political Science.—Entering students
have a knowledge of statistics equivalent to the satisfactory completion of an
troductory course in Statistics. An otherwise qualified student should satisfy this
quirement as early as possible.

Required: the general requirements, pages 93–97, 100–102, including (1) a rea
knowledge of two modern foreign languages, or a reading, writing, and speaking
ficiency in one modern foreign language, or a reading knowledge of one mo
foreign language and a specified level of knowledge in statistics, and (2) the s
factory completion of examinations in a major and a minor field of study, w
constitute the General Examination.

Each student must include in his program of study PSc 201, 202, and 207 un
by a waiver examination he can demonstrate equivalent knowledge of the sub
matter of the courses.

Major and Minor Fields of Study: Each student has a major and a minor field
study chosen from four principal *subject-matter* divisions of the discipline—The
and Methodology, International Relations, Comparative and Foreign Politics,
American Politics.

Sub-fields of Study: Each subject-matter division includes several sub-fields
study (see below) from which the student constructs his program in consulta
with his adviser. A major field of study consists of *three* sub-fields; a minor
consists of *two* sub-fields.

Fields of Study: Theory and Methodology (Analysis of Western Poli
Thought, Analysis of Marxist and Marxist-Leninist Thought, Scope and Met

of Political Science, Quantitative Political Analysis); Comparative and Foreign Politics (Comparative Political Analysis, Regional Comparative Politics, Domestic Politics of a Specified Major Political System); International Relations (International Politics, International Law, Regional International Relations, Foreign Relations of a Specified Major Political System); American Politics (American Political Process, National Policy-making Process, American Constitutional Law and Judicial Process, and State, Local, and Urban Politics).

Doctor of Philosophy fields of study in International Relations combine work in Economics, History, and Political Science.

Departmental prerequisite: PSc 4 and 6 or 5 and 6 are prerequisite to all second-group courses in Political Science and Service-Learning Political Science.

POLITICAL SCIENCE

FIRST GROUP

4 Introduction to Political Science (3) Darcy

Study of political behavior, including the role of politics in today's world, the sources of elite and mass political behavior, and the influence and nature of political institutions. Students who receive credit for PSc 4 cannot receive credit for PSc 5. (Fall)

5 Introduction to Political Science (3) Staff

Introduction to the study of comparative political systems; emphasis on structures and processes of major foreign governments and the force of basic ideologies. Students who receive credit for PSc 5 cannot receive credit for PSc 4. (Fall and spring)

6 Introduction to Political Science (3) Staff

Introduction to the study of the structure, powers, and processes of the American political system. (Fall and spring)

SECOND GROUP

101 Far East in the Modern World (3) Michael

General character of Far Eastern societies and their response to the impact of America, Europe, and Russia; American policy in the Far East and the influence of world communism. (Fall)

103 State Politics (3) Cole

Theory and practice of American federalism, factors influencing state policy choices, state responsiveness to urban problems. (Fall)

104 Urban Politics (3) Burks, Cole

Demographic trends and implications, local metropolitan political systems, issues in urban politics, strategies of political change. (Spring)

105 Scope and Methods of Political Science (3) Wayne, Kim, Darcy, Cole

Nature of political inquiry, approaches to the study of politics and government, empirical methods of research. Prerequisite: Stat 51 or 53; or equivalent. (Fall and spring)

106 **The Politics of Social Change** (3)

Theories of revolution and change; protest in American politics; urb violence and political change; institutional innovation, reform, and r sponsiveness; realistic and unrealistic strategies of change. (Fall)

107 **Issues in Modern Political Thought** (3) Lind

Issues of modern political thought as seen through major representati thinkers. Emphasis on conservative, liberal, and radical thought.

108 **Science, Technology, and Politics** (3) Logso

Examination of the multiple impacts of scientific and technological d velopments on the political system. Discussion of public policies the support, use, and control of science and technology. (Fall)

111 **Comparative Government and Politics** (3) Kim, Elliott, Gyo

Government and politics of the principal constitutional democracies Western Europe. (Fall and spring)

*112 **Comparative Government and Politics** (3) Elliott, Gyorgy, Hin

Government and politics of the communist nations; emphasis on Soviet Union and the countries of Eastern Europe. (Fall and spri

*115 **Government and Politics in Eastern Europe** (3) Gyo

Study of the contemporary social and ethnic structures, governmental s tems, and international position of the Eastern European states wi the Soviet system.

117–18 **Political Theory: Major Issues of Western Political Thought** (3–3) Linden, Fis

PSc 117: foundations of Western political thought—Plato to Aqu PSc 118: philosophical roots of modern political order and disord Machiavelli to Rousseau. (Academic year)

119–20 **American Political Thought** (3–3) Sh

Introduction to political thought in the United States from colonial ti to the present. (Academic year)

121–22 **U.S. Constitutional Law and Politics** (3–3) Mor

PSc 121: separation of powers, federal-state relationships, economic re lation. PSc 122: political and civil rights. Prerequisite: junior sta (Academic year)

125 **Legislative Process** (3) Darcy, Starr

Study of Congress, including theories of representation, legislative pow structure, selection of legislators and the roles they play, decision-maki and the relationship between the legislative and executive branches. (Fall and spring)

126 **The American Presidency** (3) Way

Examination of the politics of Presidential selection, the authority of contemporary institution, the mechanisms and processes for formulat

* PSc 112 and 115 are related in their subject matter, and credit for only one may be applied to a degree.

public policy, and the influences of personality on performance in office. (Fall)

141 **Development of Legal Institutions** (3) Staff

Introduction to historical jurisprudence: primary attention to the origins of Roman Law of Continental Europe and of Anglo-Saxon Common Law. (Spring)

145 **U.S. Political Parties and Politics** (3) LeBlanc, Darcy

Party system and structure, role of ideology, voting behavior, campaigns and elections, devices for organizing the government. (Fall and spring)

146 **Public Opinion and Political Socialization** (3) Darcy

Sources of mass political attitudes and behavior; voting and political campaigning. Prerequisite: PSc 105 or permission of instructor. (Spring)

149 **Readings on the U.S. Congress** (3) Robinson

Readings and group discussions of major writings on the structure and processes of the U.S. Congress. Open only to students who are enrolled in PSc 150 or who have congressional work experience. Selection is by a Departmental committee. (Fall and spring)

150 **Internship in Politics** (3) Robinson

Study of the political process in action through assignment to a political or governmental office. Limited to selected juniors and seniors, with preference given to seniors majoring in Political Science. Seminar open to congressional workers. (Fall and spring)

151 **Public Administration and Public Policy-making** (3) Logsdon

Examination of the process by which the federal government selects and implements public policies. Particular attention to the role of bureaucracies in the policy-making process. Criteria for the evaluation of public policy. (Spring)

160 **Modern Communist Ideologies** (3) Elliott

Intensive study of modern communism; emphasis on its antecedents and possible evolution. Careers and ideas of leading figures: Marx, Lenin, Stalin, Khrushchev, and Mao. (Spring)

*162 **Government and Politics of China** (3) Staff

Analysis of the government and politics of China, including the Chinese tradition, modern Chinese history, Marxism-Leninism, and Soviet influence.

163 **Soviet Foreign Policy** (3) Elliott

Relations with United States, Third World, China; international communism; instruments of foreign policy; interrelationships of domestic and foreign policies; ideology and foreign policy. (Fall)

*PSc 162 and 194 are related in their subject matter, and credit for only one may be applied toward degree.

167 **U.S. Foreign Policy** (3) Pur

Constitutional and political factors that determine the formulation, exe tion, and substance of U.S. foreign policy. (Fall)

171 **International Politics** (3) Starrels, Ste

International actors, international and domestic environments of fore policy, global and regional patterns, general characteristics of fore policy. (Fall and spring)

172 **International Organizations** (3) S

Development and operations of the United Nations, regional organi tions, and functional international organizations. (Fall and spring)

177 **Governments and Politics in Latin America** (3) Ste

Political processes and institutions in Latin America; emphasis on Arg tina, Brazil, Chile, and Mexico. (Fall)

178 **International Relations of Latin America** (3) Ste

U.S.-Latin American relations, inter-American diplomacy and organi tion, foreign policies of selected states, the Cuban revolution. (Sprin

179 **International Relations of the Middle East** (3) Re

Analysis of the regional and international relations of the Middle E (Spring 1976 and alternate springs)

180 **Israeli Foreign Policy** (3) Re

Examination of the institutions, processes, and issues of Israeli forei policy.

181 **Public International Law and Organization** (3) Fisch

Survey of international law; emphasis on development and trends. (Fall and spring)

183–84 **Senior Seminar: Urban Affairs** (3–3)

Readings and group discussions of major writings on urban political a policy-making processes. Primarily for senior Urban Affairs majors; othe admitted by permission of instructor. (Academic year)

185–86 **Apprenticeship in Urban Affairs** (3–3)

Study of urban political and policy-making processes through assignme to an urban-related political or governmental office. Primarily for seni Urban Affairs majors; others admitted by permission of instructor. (Academic year)

189 **African International Politics** (3) Nin

Analysis of interstate relations in Africa and of selected aspects of Af can relations with the outside world. Recommended but not require PSc 190 or equivalent. (Spring)

190 **Politics of Middle and Southern Africa** (3) Nin

Comparative analysis of the political systems of selected countries of o Mediterranean Africa. (Fall)

191 **Governments and Politics of the Middle East** (3) Reich

Domestic and international politics of the eastern Arab states, Turkey, Iran, Israel. (Fall)

192 **Governments and Politics of North Africa** (3) Reich

Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan; their relations with states of the Middle East. (Spring)

193 **Governments and Politics of South and Southeast Asia** (3) Hinton

Domestic and international politics of the major states in the area. (Spring)

*194 **Governments of China and Japan** (3) Michael

Institutions and processes of government in contemporary China and Japan, with some historical background. Attention to ideological forces. (Spring)

196 **Methods of Public Policy Analysis** (3) Staff

Models and case studies of public policy formation and changes, techniques of policy analysis and evaluation, normative implications of alternative policy-making frameworks.

197 **Proseminar: International Affairs** (3 or 6) Purcell, Reich, Storrs

Substantive problems of U.S. foreign policy. Readings, term papers, discussion.

199 **American Government and Politics** (3) Staff

Reading and research on selected contemporary problems. Limited to juniors and seniors majoring in Political Science or Public Affairs. Admission by permission of instructor.

THIRD GROUP

Third-group Political Science courses are designed for graduate students who have appropriate second-group prerequisites.

201 **Scope and Methods of Political Science** (3) Wayne

Introduction to the discipline and the profession, analysis of the nature of political inquiry, discussion of conceptual approaches to the study of politics and government. (Fall)

202 **Modes of Political Inquiry** (3) Linden

Examination and comparison of some major modes of political thought. Analysis of discursive, systematic, philosophical, and scientific approaches. (Spring)

203 **State Politics** (3) Burks

Readings and discussions on developments in state politics research, changing roles in the federal structure, state political systems, governmental performance, policy innovation and change. (Fall)

*PSc 162 and 194 are related in their subject matter, and credit for only one may be applied toward degree.

204 **Urban Politics** (3) Bu

Readings and discussions on patterns and implications of urban gro local and metropolitan political systems, policy formation and cha conflict management, political constraints on social reform. (Spri

205 **Government, Science, and Technology** (3) Logs

Examination of the demands on national and international political tems resulting from the impact of scientific and technological devel ments and of the responses of governmental institutions and proce to these demands. (Fall)

206 **Science, Technology, and Public Affairs** (3) Logs

In-depth examination of selected domestic policy issues with signific scientific or technological aspects. Teams of students will prepare po analyses on each issue discussed. (Spring)

207 **Empirical Political Analysis** (3) Da

Techniques of data gathering and analysis, the uses of data in politi research. (Spring)

208 **Seminar: Science, Technology, and World Order** (3) N

Intensive reading, discussion, and research on the impact of science technology on world order, in particular the claim that a new gl politics is replacing traditional international or nation-state politics. (Spring)

210 **Advanced Topics in Empirical Political Analysis** (3) St

Advanced techniques of data collection and analysis; varying emphasis such methods as causal modeling, analysis of variance, regression analy and simulation.

211–12 **Comparative Government and Politics** (3–3) Kim, Starr

Problems of comparative political analysis; a comprehensive examina of the literature in comparative politics. (Academic year)

213 **Comparative Communist Systems I** (3) St

Ideological foundations of communism; emergence of the Soviet syste development of the international communist movement to World War postwar formation of the Soviet bloc. (Fall)

214 **Comparative Communist Systems II** (3) St

Comparative analysis of major recent ideological trends and political ins tutions and behavior among ruling and nonruling Communist Parties. (Spring)

215–16 **Seminar: the Communist Camp in World Politics** (3–3) St

Significant issues of communism, particularly in the Soviet Union an Red China; concept and structure of "world socialist system"; intra bloc relations with emphasis on the Sino-Soviet dispute.

217 **Readings in Political Theory** (3) Linde

Readings and discussions, principally on modern political and consti

tional theory since the 17th and 18th centuries; emphasis on basic issues and schools of thought. (Fall)

219 **Seminar: Western European Politics** (3) Starrels
Comparative examination of major political system characteristics of France, England, and the two Germany's. Special attention devoted to political culture, socialization, recruitment, and communication. (Fall and spring)

221 **The United States Constitution and the Judicial Function** (3) Morgan
Lectures and group discussions on constitutional law and politics. (Fall)

224 **Readings in Socialism and Communism** (3) Elliott, Linden
Readings and discussions of works illuminating the evolution of pre- and post-Marxian socialism. (Fall)

227 **Seminar: Governments and Politics of Eastern Europe** (3) Gyorgy
Comparative study of Eastern European states: political, social, economic institutions; problems of regional integration and relations with outside powers. (Spring)

229 **Readings in Soviet Government and Politics** (3) Elliott, Linden
Readings in contemporary Soviet domestic government and politics. Prerequisite: 3 semester hours selected from Hist 146, PSc 194; or equivalent. (Fall)

*231 **Seminar: Sino-Soviet Relations** (3) Michael
Background, development, and status of conflict within the communist movement; emphasis on the role of Chinese communists. Prerequisite: 3 semester hours selected from Hist 187; P Sc 101, 194; or equivalent. (Spring)

232 **Seminar: International Communications** (3) Staff
East-West perspectives. Theory and history of national patterns of international communications focusing on basic political and psychological aspects of communication between major communist and noncommunist powers. (Spring)

233 **Seminar: Soviet Government and Politics** (3) Elliott, Linden
Research seminar in selected problems of Soviet domestic government and politics. Emphasis: since Stalin. Prerequisite: PSc 229 or permission of instructor. (Spring)

236 **Research Seminar: Intergovernmental Relations** (3) Staff
Analysis of the fiscal, structural, social, and political aspects of the evolving federal system; emphasis on metropolitan government.

244 **Public Policy Analysis** (3) Staff
Reading and research on systematic methods of public policy analysis.

* An interdepartmental course offered by the departments of Political Science and History.

245 **The American Political Process** (3) LeBlanc

Lecture and discussion on the nature and functions of political parties, interest organizations, and other political groupings in the American political system. (Fall)

246 **American Policy-making Process** (3) Wayne

Lecture and discussion on the structure and processes for formulating public policy at the national level. Emphasis on interaction between executive and legislative branches. (Spring)

253 **Seminar: Chinese Government and Politics** (3) Michael

Political institutions and concepts in late imperial times, during the revolution, under national government, and under communism. Emphasis on the communist period. (Fall)

254 **Colloquium: East Asia** (3) Michael

Interuniversity research colloquium of faculty members concerned with the study of China, Japan, and Korea. Advanced graduate students admitted with permission of faculty group. (Fall and spring)

255 **Colloquium: Russia and Eastern Europe** (3) Gyorgy

Interuniversity research colloquium of faculty members concerned with the study of Russia and Eastern Europe. Advanced graduate students admitted with permission of faculty group. (Fall and spring)

257–58 **Seminar: Communism in Developing Countries** (3–3) Staff

Examination of international communist policy for, and communist parties in the noncommunist world. (Academic year)

265–66 **Chinese Communist Policy Processes** (3–3) Hinton

Introduction to the literature and to graduate research in contemporary Chinese politics. PSc 265: readings and group discussion. PSc 266: research seminar. (Academic year)

267 **Seminar: U.S. Foreign Policy** (3) Purcell

Research and selected reading as the basis for an analysis of the foreign policy of the United States, with particular reference to the decision-making process and the execution of policy. (Fall)

268 **Seminar: Comparative Foreign Policies** (3) Staff

Research and selected reading as the basis for an analysis of the foreign policies of major powers, with particular reference to the decision-making process and the execution of policy. (Spring)

269 **Seminar: Soviet Foreign Policy** (3) Elliot

External policies and relations of the USSR; relations with other communist states, Western powers, and other countries. (Spring)

270 **Political and Social Institutions of Eastern Europe** (3) Gyorgy

Major political and social factors which have shaped the inter-war, World War II, and post-war evolution of Eastern Europe; emphasis on selected countries. (Fall)

271–72 **Problems in International Organizations** (3–3) Nau

PSc 271: analysis of the political dimension of international organizations; special reference to the United Nations. PSc 272: examination of the operational and administrative aspects of international organizations; special reference to regional and functional bodies. (Academic year)

273 **Public Opinion and Foreign Policy** (3) Purcell

Development, organization, and operation of international information programs by major world powers. U.S. public opinion influencing foreign policy formation and conduct. (Spring)

274 **Principles and Problems of International Political Communication** (3) Staff

Reading and discussion of public opinion/foreign policy relationships and operation of international political communication programs by major world powers as a tool of foreign policy. (Spring)

275 **Theories of International Politics** (3) Nimer, Storrs

Critical examination of contemporary theories, both empirical and normative. (Fall)

276 **Topics in International Politics** (3) Nimer, Storrs

Reading, research, and discussion of selected structural and procedural aspects of international political relations. (Spring)

277–78 **Seminar: Latin American Politics** (3–3) Storrs

PSc 277: readings and discussions on Latin American political processes and institutions. PSc 278: individual research and class discussion on selected topics of Latin American politics. (Academic year)

279 **Seminar: International Relations of the Middle East** (3) Reich

Reading and research on the regional and international relations of the states of the Middle East. (Spring 1976 and alternate springs)

281 **Seminar: International Law** (3) Fischer

Readings and research in selected areas of international law. (Fall)

287 **Seminar: Problems in Latin American Civilization** (3) Staff

Interdisciplinary seminar partially guided by a specialist in the methodology of his chosen discipline; each student writes a report on some aspect of a selected key theme. Admission by permission of instructor. (Spring)

288 **Seminar: Soviet Military Policy and Strategy** (3) Wolfe

Soviet developments in military policy and strategy with attention to intra-bloc military cooperation, political context of Soviet military policy, significant changes in recent Soviet military thought. (Fall or spring)

290 **Topics in African Politics** (3) Nimer

Reading, research, and discussion of selected aspects of African domestic and international politics. (Spring)

291 **Governments and Politics of the Middle East** (3) Reich
Reading and research in selected problems in the governments and politics and international relations of the Middle East. (Fall)

292 **Governments and Politics of North Africa** (3) Reich
Reading and research in selected problems in the governments and politics and international relations of North Africa. (Spring)

293 **Seminar: Governments and Politics of South and Southeast Asia** (3) Purcell
Research and selected reading as basis for analysis of structure, problems and policies of the governments of selected countries in the area, with particular reference to India. (Spring)

294 **Seminar: Governments and Politics of Japan and Korea** (3) Staff
Readings, research, and discussion on the contemporary political problems and relevant historical background of Japan, North and South Korea. (Fall or spring)

295 **Seminar: Chinese Communist Foreign Policy** (3) Hinton
Objectives; formulation and implementation; Communist China as Asian state, revolutionary influence, would-be great power. Prerequisite: 3 semester hours selected from PSc 101, 194; or equivalent. (Spring)

296 **The Communist Role in Far Eastern International Politics** (3) Hinton
Evolution of communist Asian strategy, development of Asian communist states and parties, role in international politics and crises, Sino-Soviet rivalry. (Fall)

297 **Independent Study** (arr.) Staff
Limited to Master's degree candidates. Permission of instructor, in writing, required. (Fall and spring)

298 **Southeast Asia in World Politics** (3) Staff
Southeast Asia in great-power perspective. Balance-of-power concept and development of Asian subsystem. (Spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

Fourth-group Political Science courses are designed for graduate students who have appropriate third-group prerequisites. Offered as the demand requires.

307 **Political Parties** (3) LeBlanc
Advanced readings, group discussions, and research.

308 **Public Opinion and Political Socialization** (3) Darcy
Advanced readings, group discussions, and research.

309 **The American Presidency** (3) Wayne
Advanced readings and group discussions.

310 **American Legislatures** (3) — Staff
Advanced readings and group discussions.

311 **Comparative Government and Politics** (3) — Kim, Starrels
Advanced readings and group discussions.

312 **Seminar: Comparative Government and Politics** (3) — Kim, Starrels
Advanced research.

318 **Normative Political Theory** (3) — Fischer, Linden
Advanced readings and group discussions.

325 **Research Seminar: Topics in Marxism-Leninism** (3) — Elliott, Linden
Advanced research.

345 **American Politics** (3) — LeBlanc, Darcy
Advanced research.

346 **American Government** (3) — Wayne, Morgan
Advanced research.

375 **International Politics** (3) — Nimer, Storrs, Reich
Advanced readings and group discussions.

376 **Seminar: International Politics** (3) — Nimer, Storrs, Reich
Advanced research.

398 **Advanced Reading and Research** (arr.) — Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) — Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

SERVICE-LEARNING POLITICAL SCIENCE

SECOND GROUP

154 **Law and Social Change** (6) — Staff
Study of the legal system and its role in promoting social change. Readings, group discussions, and work with lawyers and 3rd-year law students. (Fall and spring)

155 **American Political Behavior** (6) — Staff
Internships in a variety of lobbying groups. Analysis of the structural and behavioral limitations which confront those who wish to exercise political influence. (Fall and spring)

Portuguese

See "Romance Languages and Literatures."

Psychology

Professors Thelma Hunt (*Emeritus*), E.L. Phillips, J.N. Mosél, B.I. Levy, W.E. Caldwell, R.D. Walk (*Chairman*), R.K. White (*Emeritus*), M.L. Meltzer, A.D. Kirsch, Eva Johnson, Virginia Kirkbride
Adjunct Professors Rose Caron, J.B. Margolin
Professorial Lecturers B.M. MacLennan, R.K. Kahn, W.A. McClelland
Associate Professors C.E. Tuthill, R.H. Tanck (*Research*), D.E. Silber, Charle Rice, Eugene Abravanel, S.A. Karp, R.W. Holmstrom, C.J. Lange, L.A. Rothblat
Adjunct Associate Professor Devra Kleiman
Associate Professorial Lecturer S.L. Cohen
Assistant Professors J.A. Bull III, P.J. Poppen, Linda Brandt-Emler
Adjunct Assistant Professor Elyse Lehman
Assistant Professorial Lecturer Sally Sibley

CLINICAL TRAINING STAFF

Professorial Lecturer Nathene Loveland
Associate Professor J.J. McMillan
Associate Clinical Professors I.M. Zimmerman, Bruce Becker, J.W. Cummings, Mimi Spielberg, Meira Zedek, Elliot Blum, Phyllis Daen, Rochelle Kainer, J. F. Boriello
Assistant Clinical Professors Alice Adams, Patricia Crowe

Bachelor of Arts with a major in Psychology (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirements for "meaningful initiation" into the Humanities and the Natural and Mathematical Sciences.
2. Prerequisite courses—7 or 8 semester hours selected from Psyc 1, 5, and 6.
3. Required courses in related areas:

(a) 3 semester hours selected from Stat 51, 53, or any first-group courses in Mathematics except Math 6. (Students expecting to do graduate study in Psychology should elect Stat 53.)

(b) 12 semester hours selected from American Civilization, Anthropology, Economics, Geography and Regional Science, History, Philosophy (Phil 71, 113, 151 recommended), Political Science, or Sociology, of which 6 hours must be from *one* of the following: Anthropology, Economics, History, Political Science, or Sociology. If a student takes more than 6 hours in any one department, the excess will be credited to electives.

4. Required courses in the major—24 semester hours in second-group Psychology courses, including Psyc 196 and one course from each of the following groups—*Group A:* Psyc 118, 121, 161; *Group B:* Psyc 115, 144, 151, 156; *Group C:* Psyc 101, 112, 129, 131.

Although there is no foreign language requirement, students contemplating graduate study are reminded that most graduate schools require knowledge of one and sometimes two foreign languages.

Master of Arts in the field of Psychology.—Prerequisite: the degree of Bachelor of Arts with a major in Psychology at this University, or an equivalent degree. Admission to the program is limited; preference will be given those who plan to continue toward a Doctor of Philosophy degree.

Required: the general requirements, pages 93–100. Of the 24 required semester hours (exclusive of the thesis), a minimum of 18 must be in third-group Psychology courses including Psyc 202 and either 203 or 204; 6 may be in related fields approved by the Department. For detailed requirements consult the Chairman of the Department.

Doctor of Philosophy in the field of Psychology.—Prerequisite: the degree of Bachelor of Arts with a major in Psychology. Students admitted from other disciplines will be expected to complete prerequisite undergraduate courses to prepare for graduate study in Psychology. Qualifying scores on the Miller Analogies Test and the Aptitude Test of the Graduate Record Examination are required for admission.

Required: the general requirements, pages 93–97, 100–102, including (1) the satisfactory completion of the tool requirement (see page 101); (2) Psyc 202, 203–4, Stat 105; and (3) the satisfactory completion of a Preliminary Examination and later, a major Field Examination.

Areas of study: Clinical, Developmental, Experimental, Industrial and Organizational, and Social Psychology.

Students electing Psychology courses in the freshman year should begin with Psyc 1; with permission of instructor students may elect Psyc 5–6 in the freshman year.

Departmental prerequisite: Psyc 1 or 5 or 6 is prerequisite to all other courses in Psychology. Six semester hours in Psychology courses are prerequisite to all second-group courses in Psychology. The departmental prerequisite may be waived with the permission of the instructor.

FIRST GROUP

1 General Psychology (3) — Staff

Fundamental principles underlying human behavior. (Fall and spring)

5–6 Principles and Methods of Psychology (4–4) — Walk, Bull

Lecture (3 hours), laboratory (3 hours). An experimental approach to understanding behavior: individual and class experiments performed. Psyc 5: sensation, perception, and emotions and their relation to adaptive behavior. Psyc 6: topics of motivation, learning, memory, and problem-solving. Laboratory fee, $6 a semester. (Academic year)

8 Psychology of Motivation and Personality (3) — Tuthill, Silber, Rice, Holmstrom

Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, and assessment and description of personality emphasized. (Fall and spring)

22 Introduction to Educational Psychology (3) — Kirkbride, Tanck, McClelland

The contributions of psychology to education; emphasis on learning. Field work is required for all education majors. (Fall and spring)

29 Psychology of Childhood (3) Johnson, Brandt-Emle

Developmental approach to study of the child. Emphasis on the socializa tion process, learning, and the child's view of the world. (Fall an spring)

SECOND GROUP

101 Abnormal Psychology (3) Meltzer, Silber, Holmstrom

Causes, diagnosis, treatment, and prevention of various types of malad justments and mental disorders. Prerequisite: 6 semester hours psychology, or 3 in psychology and 6 in a biological science. (Fa and spring)

104 Ecology and Mental Health (3) Kar

Examination by field research of the linkages between aspects of th physical environment and mental health. (Fall)

105 The Psychology of Consumer Behavior and Attitudes (3) Phillip

Consumer behavior and attitudes in regard to advertising, buying habits consumer action groups and social pressures, and mass persuasion. Lecture and field work. (Spring)

110 Cognitive and Perceptual Development (3) Abravanel

Concepts and research in the area of developmental psychology; emphas on the growth and development of perception, cognition, and languag (Spring)

112 Psychology of Adolescence (3) Johnso

Psychological characteristics and problems peculiar to adolescence, wi emphasis on application of psychology to solution of such problem (Fall)

115 Psychology of Language and Communication (3) Mos

Introduction to psycholinguistics and verbal behavior. Information theor generative grammar theory, cultural and linguistic structures in the p ception and learning of language. (Fall and spring)

117 Psychology of Art and Picture Perception (3) Wal

Theories of Arnheim, Gibson, Gombrich, and Goodman as related to and picture perception; study of cross-cultural research and research w children.

118 Neuropsychology (3) Rothbl

Analysis of neural processes underlying behavior. Basic structure an functions of the nervous system, with emphasis on sensory process learning and memory, motivation, and emotion. (Fall and spring)

121 Psychology of Learning (3) Bu

Theories and issues related to basic learning processes as determinants behavior. Emphasis on current research using both human and anim subjects. (Fall)

122 **Psychology and Human Relations** (3) Silber

Understanding human relations and T-group techniques by evolving an on-going T-group within the course itself. For junior and senior undergraduate social science majors; open to others with permission of instructor.

129 **Theories of Personality** (3) Kirkbride, Karp, Poppen

Survey of personality theories: emphasis on their application to problems of individuals. (Fall and spring)

131 **Psychological Tests** (3) Hunt, Karp, Holmstrom

Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $7. (Fall and spring)

132 **Socialization in Childhood** (3) Brandt-Emler

Examination of primary methods by which the child is shaped in terms of social judgment and self control; internalization of controls, assimilation of societal values and parenting procedures. Organized by focus on issues according to developmental level.

135–36 **Seminar: Community Mental Health** (3–3) Levy, Meltzer

Survey of issues and techniques in community mental health; emphasis on educational systems and community mental health in the schools. Involves practicum work in school setting. Participation both semesters expected. Open to juniors and seniors with permission of instructor. Prerequisite to Psyc 136: Psyc 135. (Academic year)

144 **Personnel and Industrial Psychology** (3) Mosél

Psychological concepts and methods applied to problems of personnel management, human engineering, employee motivation, and productivity. (Fall)

150 **Psychology of Sex Differences** (3) Poppen

Relevant biological, psychological, and sociological influences on males and females in the development of sex differences: hormonal differences, gender identity, differential socialization of sons and daughters, masculinity/femininity, cultural evaluation of male and female roles. Survey of relevant psychological theory. Emphasis on empirical research and hypothesis testing. Admission by permission of instructor.

151 **Social Psychology** (3) Tuthill, Poppen

Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war. (Fall and spring)

154 **Psychology of Criminology** (3) Silber

Examination of many psychological aspects of criminal behavior; personality of criminals and of psychological processes affecting behavior.

156 **Psychology of Attitudes and Public Opinion** (3) Tuthill

Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare. (Spring)

161 **Comparative Psychology** (3) Caldw

Lectures and demonstration on animal psychology. Psychological pr esses in infrahuman organisms, evolution of behavior, the place of ani experimentation and research in psychology. (Spring)

170 **Clinical Psychology** (3) L

An exploration of the history, functions, and problems of the clini psychologist. Assessment, treatment, community approaches, ethics. P requisite: Psyc 101, 131. (Spring)

*188 **Attitudes toward Death and Dying** (3)

Exploration of the many different aspects, attitudes, and experiences sociated with the process of death and dying. Limited to juniors seniors.

191 **Independent Research in Psychology** (3) S

Opportunity for work on individual library or experimental projects. Op to qualified students by permission; arrangements must be made with sponsoring faculty member prior to registration. May be repeated for credit. (Fall and spring)

192 **Field Experience in Psychology** (3) Abravanel, L

Selected senior psychology majors will spend a minimum of 6 hours week in a local hospital, school, or community setting. Students regist ing for this course must have the approval of the instructor by May for the fall semester and by December 15 for the spring semester. (Fall and spring)

196 **History and Systems of Psychology** (3) Caldwell, Ro

Senior capstone course which includes a survey and integration of m major viewpoints and concepts of psychology. Required of Psychol majors. (Fall and spring)

198 **Current Research Issues in Psychology** (3) Sta

Conducted as a seminar. Recent experiments in psychology, includi those performed by members of the class; emphasis on student particip tion. May be repeated for credit. (Spring)

THIRD GROUP

Third-group courses are limited to graduate students in Psychology, except by speci permission of instructor.

202 **Psychological Research Methods and Procedures** (3) Abravanel, Bull, Silb

Required in all graduate Psychology programs. Prerequisite: graduat standing, a laboratory course in psychology, and an elementary cours in statistics. (Spring)

203–4 **Experimental Foundations of Psychology** (3–3) Bull, Rothbl

Required of doctoral students in Psychology during first year of study Psyc 203: basic issues in learning and motivation. Psyc 204: physiolog cal processes; sensation and perception. (Academic year)

* Offered jointly by the Department of Psychology and the Division of Experimental Programs.

205 **Research Methods in Intervention Programs** (3) Karp

Special problems of conducting research in a clinical setting; emphasis on content and method of studies designed to assess effects of therapeutic intervention. Prerequisite: Psyc 202. (Fall)

206 **Methods of Clinical and Personality Research** (3) Rice

Review of techniques especially relevant to research in clinical, personality, and social psychology. Scaling methods, multivariate techniques, introduction to the use of computers in data analysis. Prerequisite: Psyc 202; Stat 105 or equivalent. (Spring)

207–8 **Psychological Assessment** (3–3) Holmstrom, Levy, Meltzer, Silber

Open only to clinical graduate students in the Department of Psychology. Theoretical and clinical aspects of assessment; includes interviewing, psychometric tests, and projective techniques. Two-hour laboratory—diagnostic work at clinical facilities. Material fee, $7 a semester. (Academic year)

209 **Seminar: Psychology of Motivation** (3) Caldwell

Various theoretical approaches to the psychology of motivation; systematic concepts and experimental findings deriving from each approach. (Spring)

211 **Assessment of Cognitive Functioning** (3) Levy

Concepts of intelligence and achievement and their assessment through a variety of individual procedures. Material fee, $7. Admission by permission of instructor. (Summer)

212 **Personality Assessment by Projective Techniques** (3) Levy

Methods of personality assessment, including psychometric and projective tests. Material fee, $7. Admission by permission of instructor. (Summer)

213–14 **Seminar: Developmental Psychology** (3–3) Abravanel, Walk, Lehman, Brandt-Emler

Psyc 213: research and theory in developmental psychology, emphasis on perceptual and cognitive development; consideration of the development of social awareness and of genetic-biological growth processes. Psyc 214: current research and theory in perceptual and cognitive development, intensive study of selected research problems. (Academic year)

215 **Personality Assessment by Multiple Procedures** (3) Meltzer

Consideration and use of a wide range of procedures in assessment of personality and psychopathology of children. Prerequisite: Psyc 207–8 or 211 and 212. Graduate students in fields other than Psychology admitted by permission of instructor. Material fee, $7.

216 **Psychological Assessment by Graphic Means** (3) Levy

Examination of graphic procedures for assessment of intelligence and personality; clinical use and evidence of validity. Common interpretive principles sought. Human figure drawings and free paintings as examples. Admission by permission of instructor. (Fall)

218 **Seminar: Systems of Psychotherapy** (3) Si

Introduction to theory and technique of psychotherapeutic approac psychoanalytic, ego-centered, nondirective, transactional, and others. C inal sources surveyed. Limited to graduate students in clinical psychol except when offered in Summer Sessions. (Spring)

220 **Seminar: Abnormal Psychology** (3) Mel

Study of selected problems. (Fall)

221–22 **Seminar: Group Psychotherapy** (3–3) MacLen

For graduate students in clinical psychology; open to others, permission of instructor, only when space permits. Psyc 221: dida material and laboratory experience with emphasis on group dynam and processes; survey of group therapy approaches. Psyc 222: supervi experience with therapeutic groups. Prerequisite to Psyc 222: Psyc 2 (Academic year)

223 **Seminar: Learning** (3)

Selected topics of current research interest in the psychology of lea ing. (Spring)

226 **Seminar: Clinical Psychology of Childhood and Adolescence** (3) Johns

Survey of behavior and personality disorders. (Spring)

227–28 **Seminar: Principles of Psychotherapy** (3–3) Kal

For graduate students in clinical psychology; open to others, with pe mission of instructor, only if space permits. Patient's needs and demand on the therapist. Case participation heavily relied upon. Prerequisite Psyc 218. (Academic year)

229 **Seminar: Principles of Behavior Change** (3) Philli

Stimulus-organism-response variables and their interactions, with em phasis on learning theory as applied to clinical problems. (Fall)

230 **Seminar: Operant Applications to Clinical Problems** (3) Sibl

Examination of the broad role of reinforcement contingencies, behavi shaping, and other experimentally derived concepts as they apply to t management and control of a wide variety of human clinical problem Prerequisite: Psyc 229. (Spring)

231 **Development of Psychometric Instruments** (3) Mo

Quantitative techniques and principles used in construction, standardiz tion, and evaluation of personality and ability measures for research an practice; quantification of human judgment for measurement purpose Prerequisite: course in tests and measurements and an elementary cours in statistics. (Fall)

234 **Seminar: Theory of Psychological Measurement** (3) Mo

Development of classical axiomatic-deductive theory underlying major a tions in the construction and evaluation of psychological tests. (Spri

235–36 **Seminar: Community Mental Health** (3–3) Meltzer, Le

For graduate students in the Department of Psychology; open to other

with permission of instructor, only if space permits. Survey of issues and techniques in community mental health; emphasis on educational systems and community mental health issues in the schools. Involves project in school setting. Prerequisite to Psyc 236: Psyc 235. (Academic year)

245 **Seminar: Organizational Behavior** (3) Mosél

Analysis of organizational behavior; emphasis on motivation and productivity. Recent research on employee attitudes, primary group, supervisory leadership, formal and informal organization, job design. (Fall)

246 **Seminar: Personnel Measurement Techniques** (3) Mosél

Detailed consideration of techniques of personnel selection and performance evaluation. Employment tests, personal data, assessment interviews, and performance ratings.

251 **Seminar: Advanced Social Psychology** (3) Tuthill, Poppen

Current research and theory: motivation and cognition, dissonance, social interaction theory, authoritarianism, class differences, group dynamics, group conflict. (Fall)

252 **Research Methods in Social Psychology** (3) Tuthill, Poppen

Opinion and attitude survey techniques: interviewing, content analysis, report-writing, etc. (Spring)

254 **Seminar: Experimental Social Psychology** (3) Tuthill

Experimental study of small groups, group climates, interaction process analysis. Lewin's field-theoretical approach to individual and group processes. (Spring 1976 and alternate springs)

256 **Seminar: Psychological Causes of War** (3) White

An attempt to integrate evidence from animal behavior, child behavior, anthropology, psychiatry, and recent history, including World Wars I and II and the present East-West conflict. (Spring)

259 **Seminar: Psychology of Communism** (3) White

Public and governmental opinion in communist countries, authoritarian thinking, communist propaganda, problems of Western communication with communist countries. (Fall)

261 **Seminar: International Communication** (3) Mosél

Primarily for students in the schools of Government and Business Administration and Public and International Affairs. Communicating information and effecting attitude change across cultures by mass media. Psychocultural factors and the functions of mass communication in the development of transitional societies. (Spring)

268 **Seminar: Neuropsychology** (3) Rothblat

Selected problems in research relating the brain and behavior. Independent topics each semester such as sensory processing, brain development and behavior, clinical aspects of nervous system function.

272 **Seminar: Theories of Personality** (3) Caldw

Emphasis on theoretical problems and methodology in the field of p sonality study. (Fall 1975 and alternate falls)

274 **Comparative Psychology and Ethology** (3) Caldw

Synthesis of the principles and findings of ethology and comparative p chology. Examination of the theories and findings of Lorenz, Tinberg and Jakob von Uexküll in the light of recent experimental investigatio (Fall 1976 and alternate falls)

283–84 **Practicum in Clinical Psychology** (3–3) Silv

Supervised practical instruction in agencies doing clinical psycholog work; requires 64 full-time days during the year. Prerequisite: Psyc 2 Admission by permission of instructor. (Academic year)

289 **Seminar: Current Topics in Experimental Psychology** (3) St

Review and discussion of contemporary research and theory in a speci ized field of psychological study, by leaders in the field. Independe topics each semester; may be repeated for credit. (Fall and spri

291 **Theories of Organizational Behavior** (3) Cobe

Examination of current theoretical models and research. (Spring)

292 **Seminar: Perception** (3) Wal

Study of current research and theory in the experimental psychology o perception. (Spring)

293 **Seminar: Psychology of Thinking** (3) Ro

Review of basic theoretical positions concerning the processes of cogn tion: memory, concept formation, and reasoning. (Spring 1976 an alternate springs)

295 **Independent Research in Psychology** (3) Sta

Individual library or experimental research under supervision of sta member. Arrangements must be made with sponsoring faculty membe prior to registration. May be repeated for credit. (Fall and spri

299–300 **Thesis Research** (3–3) Sta

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Sta

Limited to students preparing for the Doctor of Philosophy major field e amination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Sta

Limited to Doctor of Philosophy candidates. May be repeated for cred (Fall and spring)

RELATED COURSE IN PSYCHIATRY AND BEHAVIORAL SCIENCES

The following course, offered by the Department of Psychiatry and Behavioral Sciences in the University's School of Medicine and Health Sciences, is opened to advanced graduate students in Clinical Psychology. For detailed description, consult the *School of Medicine and Health Sciences* catalogue.

365–66 *Seminar: Clinical Introduction to Family Diagnosis and Therapy* (3–3)

Public Administration

Professors D.S. Brown, Waldo Sommers (*Emeritus*)
Professorial Lecturers Ben Posner, C.L. Berg, Louis Levine, T.W. Taylor, J.L. Westrate
Associate Professor S.R. Chitwood, M.M. Harmon (*Chairman*)
Associate Professorial Lecturer J.F. Magnotti
Assistant Professors Irwin Dubinsky, B.L. Catron, Elizabeth Cox
Assistant Professorial Lecturers Michael Springer, M.B. Young

Programs of study in Public Administration leading to the degrees of *Master of Public Administration*, *Master of Arts in Government*, and *Doctor of Public Administration* are offered by the School of Government and Business Administration (see pages 133–63).

210 **Concepts and Issues in Public Administration** (3) Brown, Harmon
Introduction to graduate study in public administration. Professionalism and the public service. Nature of public interest; multiplicity of organizational objectives. Administrative responsibility and individual and organizational ethics. Individual goals and career planning. (Fall and spring)

THIRD GROUP

213 **Administration in the Federal Government** (3) Brown, Taylor, Westrate
(Formerly Administration in Government)
Critical analysis of federal administrative organizations as an integral part of the political system. Roles of Congress, the President, the courts, interest groups, political parties, and the public in the public decisional process. Special attention to centripetal and centrifugal forces. (Fall and spring)

214 **Policy Analysis in Public Administration** (3) Catron
Introduction to systematic analysis of public policy alternatives. Development of conceptual frameworks for differentiating types of public policies, e.g., distributive, regulatory, redistributive; examination of the contribution of economic, quantitative, and research techniques to the development, administration, and evaluation of these policies. (Fall and spring)

217 **Seminar: Development Administration I** (3) Belaunde-Ter

The nature of underdevelopment. Specific problems of less develop countries. National cultures and political and administrative systems. T giving of assistance: types of foreign aid; problems of working with a givers. (Fall)

218 **Seminar: Development Administration II** (3) Bro

Problem of the transfer of administrative capability from one country another. Political and administrative development. Unilateral and mu lateral approaches. The role of the innovator. Strategies of administ tive development. (Spring)

220 **Law and the Public Administrator** (3) Chitwo

(Formerly Law, Responsibility, and the Public Administrator)

Exploration and analysis of the functions of law in a democratic socie Emphasis is placed upon the procedural, historical, and jurisprudential d mensions of American law. This broad perspective seeks to convey more perceptive understanding of the law as a legal and moral force gui ing and constraining public decision making. (Spring)

221 **Organization Theory and the Public Sector** (3) Catt

(Formerly Management in the Executive Branch)

Analysis of organization theory with special focus on public organization current issues in organization theory; decision-making, the organizational environment, and the changing nature of organizations in a post-industri society. (Fall and spring)

223 **Behavioral Factors in Large Organizations** (3) Brow

Analysis of the nature and characteristics of large organizations. B reaucracies and their behavioral patterns; dysfunctionalism. Approaches t policy guidance and leadership, particularly in large public organizations influence and control systems. Future trends. (Fall and spring)

231 **Public Personnel Administration** (3) Sommer

Survey of basic principles and functions of personnel administration i the public service. Roles of personnel management, recruitment, place ment, wage and salary administration, training, retirement, and other personnel functions. (Fall)

232 **Problems in Public Personnel Management** (3) Sommer

Analysis and evaluation of major personnel management problems in government; employee-management relations; interagency and intergov ernmental relationships. Impact of automation. Evaluation of personnel systems. (Spring)

233 **Seminar: Manpower Development and Utilization** (3) Dubinsk

Examination of public and private manpower trends, problems, policies and programs. Exploration of approaches, old and new, to manpower development and utilization. Analysis of impact of economic, political and social factors on manpower. Students will select a specific area for individual investigation. (Fall)

235 **Technological Change and Manpower** (3) Roma

Research, discussion, and readings dealing with manpower problems aris

ing from automation and other technological changes. Evaluation of these developments in government and business; their implications for productivity, employment, training and education, and personnel and industrial relations. Analysis of economic, political, and social factors influencing public and private manpower policies. (Spring)

245 **Intergovernmental Relations** (3) Cox, Magnotti
(Formerly Managing the Changing Federalism)
Assessment of the impacts and consequences of changes in the administration of intergovernmental policies and programs in the federal system. Legislation, roles, and responsibilities of federal, state, regional, and local systems will be examined from both theoretical and practical vantage points to understand their effects. (Fall and srping)

246 **Dynamics of Citizen Participation in Administration** (3) Dubinsky
Examination of the nature of participation in a democratic society. An analysis of the characteristics and dynamics of citizen-based organizations. Exploration of effective methods or models by which administrators may utilize citizen participation. (Fall)

248 **Financing Local Government** (3) Cox
(Formerly Financing Metropolitan Services)
Analysis of the structure and administration of public finance in local governments. Includes the financing of services through municipal taxation and other revenue sources, debt administration, and implications of the budgetary process. (Fall and spring)

249 **Urban Public Policy** (3) Staff
(Formerly Administration in Metropolitan Area Governments I)
Examination of views of the city. Emphasis on urban systems in their social, political, economic, and physical aspects. Against the background of urban politics and administration, will address such central functional areas as health, education, welfare, crime, poverty, transportation, and housing. (Fall and spring)

250 **Administration of State and Local Governments** (3) Cox
(Formerly Administration in Metropolitan Area Governments II)
Examination of state and local governmental structures and functions, public and private demands, their place within the federal system, their limitations, and alternatives available to encourage more effective administration. (Fall and spring)

251 **Governmental Budgeting** (3) Page, Posner
Survey of the basic concepts, principles, and practices in governmental budgeting; interrelationship of planning, programming, and budgeting; their role in the management process. (Fall and spring)

252 **Public Expenditure Analysis and Planning** (3) Chitwood
(Formerly Problems in Planning, Programming, and Budgeting)
Intensive analysis of managerial and economic procedures and techniques used by government agencies for planning, allocating, and managing scarce resources in the achievement of public programs. Topics discussed include benefit-cost analysis, program budgeting, systems analysis, present value analysis, and government contracting. (Fall and spring)

260 **Policy Formulation and Administration** (3) Harmon, Spring
Analysis in depth of factors and processes involved in policy developme with particular attention to selected areas of national policy; developme of agency goals and objectives. (Fall and spring)

262 **Seminar: Science, Technology, and Public Policy** (3) Bla
The impact of science and technology upon public administration in ter of both administrative practice and national policies. (Spring)

273 **Colloquium: Public Administration and American Political and Social Institutions** (3) Chitwoo
Supervised study in depth of contemporary literature in selected fiel and of research methodology in public administration. Primarily f doctoral candidates. (Fall)

274 **Colloquium: Trends in Public Administration Theory** (3) Harmo
Survey of contemporary normative and epistemological issues in publ administration theory and practice. Analysis of the past and present in fluence of logical positivism, behavioralism, humanism, existentialism phenomenology, and public interest theory. Required for doctoral candi dates; open to advanced Master's degree candidates with permission o instructor. (Spring)

290 **Special Topics in Public Administration** (3) Staf
An experimental course enabling the department to develop new cours topics and test new teaching methods. May be repeated once for credit. (Fall or spring)

292 **Public Program Evaluation** (3) Dubinsk
Theory and practice of program evaluation and evaluative researc Exploration of scope and limitations of current practice in evaluatio due to economic, political, social, and administrative factors. Examin tion of methodological considerations for data collection, analysis, an dissemination. Students will conduct individual evaluative projects. (Spring)

295 **Research Methods** (3) Dubinsk
Survey of research methods; application to problems of public admini tration. (Fall and spring)

298 **Directed Readings and Research in Public Administration** (3) Staf
(Formerly PAd 271 Readings and Research in Public Administration)
Supervised reading in selected fields within public administration. Admi sion by permission of instructor. May be repeated once for credit. (Fall and spring)

299 **Thesis Seminar** (3) Staf
Examination of thesis standards, research philosophy and methodology i public administration. (Fall and spring)

300 **Thesis Research** (3) Staf
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) **Staff**
Limited to students preparing for the Doctor of Public Administration general examination. May be repeated for credit (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**
Limited to Doctor of Public Administration candidates. May be repeated for credit. (Fall and spring)

Public and International Affairs

Professors R.H. Davison, J.W. Kendrick, C.E. Galbreath (*Emeritus*), R.B. Thompson, J.N. Mosél, F.H. Michael, Joseph Aschheim, H.L. LeBlanc, R.K. White (*Emeritus*), Andrew Gyorgy, Benjamin Nimer, R.P. Sharkey, C.T. Stewart, Jr., J.W. Robb, Helen Yakobson, H.C. Hinton, H.M. Sachar, George Stambuk, Henry Solomon, Vladimir Petrov, B.M. Sapin, Chung-wen Shih, R.K. Lewis, Ching-Yao Hsieh, Gaston Sigur, Marvin Gordon, P.P. Hill, J.A. Morgan, Jr., Richard Thornton, Herman Pollack (*Research*)
Adjunct Professor T.F. Carroll
Professorial Lecturers John Hardt, Tao-tai Hsia, Bernard Ramundo, Lothar Metz, T.W. Wolfe, Eleanor Hadley, Abraham Halpern, J.F. Coates
Associate Professors W.R. Johnson, C.A. Moser, R.Y.C. Yin, J.K. McDonald, C.F. Elliott, R.M. Dunn, Jr., Bernard Reich, Young Kim, C.A. Linden, G.C. Eads, S.J. Wayne, J.M. Logsdon, P.F. Klarén
Adjunct Associate Professors Donald Robinson, R.A. Young
Associate Professorial Lecturers Philip True, Horia Socianu
Assistant Professors G.C.Y. Wang, D.L. Lee, R.E. Darcy, J.M. Starrels, S.W. Burks, S.A. Grant, A.M. Yezer, H.R. Nau, R.L. Cole, Dana Fischer, K.J. Langran, L.P. Ribuffo
Assistant Professorial Lecturer L.L. Perez

Programs of study in Chinese Language and Literature, *East Asian Studies (China and Japan)*, International Affairs, Public Affairs, and Urban Affairs leading to the degree of *Bachelor of Arts* and programs of study in International Affairs, Latin American Studies, Public Affairs, Russian Studies, and Science, Technology, and Public Policy leading to the degree of *Master of Arts* are offered by the School of Public and International Affairs (see pages 164–80).

INTERNATIONAL AFFAIRS

The following courses are offered only in the War College Curriculum:

260 **Fundamentals of National Power** (3)

261 **International and U.S. Foreign Policy** (3)

262 **National Security Policy of the United States** (3)

297 **Readings in International Affairs** (1, 2, or 3)

299–300 **Thesis Research** (3–3)

Religion

Professors R.G. Jones (*Chairman*), H.E. Yeide, Jr., Dewey Wallace, Jr.
Professorial Lecturer Arnost Lustig
Associate Professors A.J. Hiltebeitel, Leivy Smolar (*Visiting*)
Associate Professorial Lecturer Eva Jospe
Assistant Professors Sonya Quitslund, D.A. Altshuler

Bachelor of Arts with a major in Religion (Field-of-Study).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—Rel 9, 10, and 59-60.

The coordinated field of knowledge upon which the student will be examined in his major examination at the end of the senior year includes the history and literature of the world's religions and the philosophical and ethical problems of religious thought. A student may elect to give special emphasis in his program to Christianity, Judaism, or the religions of India. A proseminar (Rel 199–200) assists the student in preparing for the major examination. A pamphlet containing a detailed description of the major is available in the offices of the Dean of Columbian College of Arts and Sciences and the Chairman of the Department of Religion.

Master of Arts in the field of Religion.—Prerequisite: the degree of Bachelor of Arts with a major in Religion from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. Of the 24 semester hours of required courses (exclusive of the thesis), at least 12 must be in third-group Religion courses; a maximum of 9 may be in a closely related field outside the Department of Religion as approved by the Department. The Master's Comprehensive Examination must cover three fields (the thesis research must be on one of these three fields) selected from the following: the Old Testament, the New Testament, History of Christianity, Judaism, History of Religion in America, Modern Religious Thought, Ethics, Sociology of Religion, and History of Religions. A reading knowledge examination, usually in French or German, is required; however, Hebrew or Greek is acceptable for those students whose thesis area is in the Biblical field and Sanskrit or an Eastern language for those whose thesis area is in the History of Religions.

Master of Arts in the field of Religious Education.—Prerequisite: the degree of Bachelor of Arts with a major in Religion from this University, or an equivalent degree. The undergraduate program should have included the following courses or equivalent: Anth 1; Educ 108; Psyc 1, 22, and 29; SPDR 1 or 11.

Required: the general requirements, pages 93–100. Of the 24 semester hours of required courses (exclusive of the thesis), at least 6 must be in third-group Religion courses; a maximum of 12 may be in a closely related field outside the Department of Religion as approved by the Department.

*Master of Arts in the field of Religion and Medical Care**.—Prerequisite: (1) the

* Certain courses in this program are offered only through Off-campus Centers of the College of General Studies.

degree of Bachelor of Arts with a major in Religion from this University, or an equivalent degree; (2) a first professional theological degree; or (3) acceptable academic work required of entering medical students who have not earned a Bachelor's degree, but who are pursuing the degree of Doctor of Medicine.

Required: the general requirements, pages 93–100. The program of study consists of 36 semester hours of approved course work with or without a thesis. Students must elect course work covering four fields selected from Clinical Pastoral Care, Religion, Sociology, Psychology, Health Care Administration, and Medicine. The course work in these fields must be distributed as follows: 12 semester hours each selected from two fields and at least 6 hours in Clinical Pastoral Care. The Master's Comprehensive Examination must cover three fields selected from the list above, one of which, as approved by the Department, must be outside of the Department of Religion. Supervised clinical education may be offered as a tool subject in lieu of the required reading knowledge examination in a foreign language.

Master of Arts in the Field of History of Religions—Hinduism—(Consortium of Universities program). Prerequisite: The Bachelor of Arts degree from this University with suitable background in the study of religion of South Asia or an equivalent degree.

Required: the general requirements, pages 93–100. The program of study consists of 24 hours of course work (exclusive of thesis) selected from upper-division and graduate courses of member universities of the Consortium as determined by the Department of Religion, including a sequence of four courses in the literature of the Hindu tradition and one course in method in History of Religions. The Master's Comprehensive Examination must cover the following: methods in the study of religions, thematic comparisons between the Hindu tradition and at least two other religious traditions, including at least one Western tradition, and a special field in Hindu tradition. A reading knowledge examination in a foreign language, usually in French or German, will be required, and a student must take at least two semesters of either Sanskrit or Hindi in addition to the 30 hours of required courses for graduate credit.

Doctor of Philosophy in the field of American Religious History (offered in cooperation with the Department of History).—Required: the general requirements, pages 93–97, 100–102. The General Examination must cover four fields, including two from the Department of Religion (History of Religion in America and either Early Christianity or European Christianity since 1500) and two from the Department of History (generally American Social History and one other).

FIRST GROUP

9 The Hebrew Scriptures (3) Staff

Historical and literary study of the Hebrew Scriptures with consideration of development of religious ideas, institutions, and outstanding personalities. (Fall)

10 The New Testament (3) Jones

Study of New Testament literature from the standpoint of occasion, purpose, dominant ideas, and permanent values. Emphasis on approach, structure, and significance of the Gospels and Epistles. (Spring)

21 Religion and Man's Search for Meaning (3) Yeide

(Formerly Introduction to Religious Thought)

Traditional religious concepts, language of contemporary religion amidst modern scientific and secular intellectual tendencies, and the place of religion in today's society. (Fall)

22 **Religion and Contemporary Social Issues** (3) Yeid
(Formerly Introduction to Social Ethics)
Illumination of social problems by ethical reflection; examination of eth cal perspectives as stimuli and barriers to social change; techniques maintaining social values and seeking change. (Spring)

59–60 **History of Religions** (3–3) Wallace, Hiltebeit
Origins, evolution, and contemporary status in historical context. Rel 59 primitive religion and the religions of the East (Hinduism, Buddhi Taoism, Confucianism, Shinto). Rel 60: religions of the West and Ne East (ancient religions, Judaism, Christianity, Islam). (Rel 59 a 60—fall and spring)

SECOND GROUP

103 **The Prophets** (3) Quitslun
Development of prophetism in the Old Testament; cultural, economi psychological, and religious factors; elements of lasting value in th prophetic teaching. Study of selected prophets. (Spring)

104 **The Life and Thought of Jesus** (3) Quitslun
Comprehensive study of the life and teachings of Jesus with critical a tention to sources. (Spring)

105 **The Life and Thought of Paul** (3) Quitslun
Backgrounds of early Christianity, first-century religious and social con tions affecting the spread of Christianity, the life and journeys of Pa Paul's presentation of the Christian faith. (Fall)

111 **Myth, Epic, and Novel** (3) Hiltebeit
Exploration of the religious themes and cultural significance of literature e.g., Indian and Babylonian epic; the Bible; Greek epic and drama; Dant and Milton; Dostoevsky, Kafka, Hesse, Faulkner, Beckett, and Clau (Fall)

122 **Christian Ethics and Modern Society** (3) Yeid
Nature and principles of Christian life as developed by the Christia community; problems of personal conduct; application to family, socia and economic institutions. (Fall)

124 **Contemporary Movements in Theology** (3) Quitslun
Theological approach and systems of a selected number of moder theologians.

126 **Western Mysticism** (3) Quitslun
Study of the phenomenon of religious experience and of selected mystic in Judaism, Christianity, and Islam. (Spring)

127 **Medicine, Religion, and Healing** (1) Staf
Total care concept. Importance of religion in medical practice for pa tient and physician. Concept of the professional man, the clergy's rol in healing, religious perspective on issues in medical ethics. (Spring

135 **History of Judaism to the Talmud** (3) Staff

History and religious thought of the Jewish people from the Maccabean revolt to the compilation of the Talmud. (Fall)

136 **History of Medieval and Modern Judaism** (3) Staff

History and religious thought of the Jewish people from the compilation of the Talmud to the present. (Spring)

137 **The Land of Israel and the Growth of the Western Religions** (6) Staff

138 **Major Trends in Modern Judaism** (3) Staff

Religious developments in Judaism as reflected in major writers and movements since Mendelssohn. Writings illustrative of Orthodox, Conservative, Reform, and Reconstructionist thought. (Spring)

139 **Meaning of the Talmud in Jewish Life** (3) Staff

Historical setting for the compilation of the Talmud; analysis of content and methodology; detailed study and exegesis of some major portions in English translation. (Fall)

141–42 **Religious Education** (3–3)

Religious education in the home, church, and community; basic educational procedures and special techniques; organization and administration.

143 **Early Christianity and the Spiritual Life of the Ancient World** (3) Wallace

Rise and development of Christianity in relation to the culture, philosophy, mystery religions, and general religious life of the Graeco-Roman world to A.D. 500. (Fall)

144 **Medieval Faith and Symbolism** (3) Wallace

Christian life and thought in the Middle Ages: mystics, saints, popes, and philosophers. (Spring)

145 **Religious Currents in the Renaissance and Reformation** (3) Wallace

Transformation of Western man's understanding of his identity and destiny from the end of the Middle Ages to the Age of Reason.

146 **Christianity in the Modern World** (3) Wallace

Changing religious styles and patterns since the Age of Reason as seen in theology, literature, political life, and religious institutions.

157 **Indian Philosophy and Mysticism** (3) Hiltebeitel

Indian speculative and mystical traditions; late Vedas, Upanishads, Bhagavad Gita, Buddhist, and Hindu soteriological systems.

158 **Ancient Indian Literature and Religion** (3) Hiltebeitel

Studies of foundational texts of Hinduism, especially ***Rig Veda, Brahmanas,*** *Mahabharata,* (including the *Bhagavad Gita*); attention to Hinduism's archaic and seminal themes. (Fall)

159 **Mythologies of India** (3) Hiltebeitel

The lore of Indian gods (Vedic, Puranic), heroes (epics), and holy men (Hindu, Buddhist, Jain, Tantric); its ties with Indian caste, cult, cosmology, and spiritual ideals.

160 **Buddhism** (3) Hiltebeitel

Origin, development, and contemporary status of Buddhist life and thought; its impact on Asian civilization. (Spring)

161 **Islam** (3)

Origin, development, and contemporary status of Islamic life and thought; its impact on the Near East.

162 **Symbolism in the History of Religions** (3) Hiltebeitel

Religious symbolism, myth, legend, and ritual in the religions of the world; various theoretical analyses. (Spring)

172 **Religion in American Culture** (3) Wallace

Growth of religious bodies and institutions in relation to American culture, development of religious thought, and analysis of the contemporary religious scene. (Spring)

181 **Woman in Western Religion** (3) Quitslund

Historical, theological, and ethical investigation of the image and role of woman in Judaism and Christianity; special consideration of the Biblical experience, the sexual qualifications for religious office, use of male-female images and languages, and contemporary issues. (Fall)

199–200 **Proseminar: Readings for the Major** (3–3) Staff

Readings and group discussions. (Academic year)

THIRD GROUP

209–10 **Seminar: Biblical Studies** (3–3) Jones

Main problems of Biblical literary, historical, and theological criticism.

213 **Seminar: Inter-testamental Judaism** (3) Jones

Historical and religious development of Judaism as seen in the Apocrypha, Pseudepigrapha, Dead Sea Scrolls, Philo, and early Rabbinism. (Spring)

*216 **Supervised Clinical Pastoral Education (I–A)** (6) Staff

Full-time program of clinical pastoral education in an approved center. Involvement in the responsibility for pastoral ministry is reviewed and evaluated in a peer-group context.

*217 **Supervised Clinical Pastoral Education (I–B)** (6) Staff

Continuation of Rel 216 with emphasis on pastoral and personal identity, sustained pastoral relationships, and pastoral methods and skills.

*218 **Supervised Clinical Pastoral Education (III–A)** (6) Staff

Responsibility in pastoral ministry is increased with emphasis on group work, interprofessional involvement, use of specific counseling methods,

work with persons with special problems. Prerequisite: Rel 216 and 217; or equivalent.

*219 **Supervised Clinical Pastoral Education (III–B)** (6) Staff

Continuation of Rel 218 with emphasis on examination and review of administrative procedures, design of pastoral programs, and development of pastoral theology.

222 **Seminar: Christian Ethics** (3) Yeide

Important tendencies in ethical reflection of the contemporary Christian Church; contributions of social sciences to that reflection. (Spring)

*223 **Religious and Ethical Perspectives on Medical Problems** (3)

Religious and ethical questions in medical problems and medically related issues.

*225 **The Dynamics of Ministering to the Young Adult** (3)

Conceptual models of development of young adults from late adolescence; special problems of educational and military experience, vocational choice, marriage and the family, and physical, intellectual, emotional, and religious development. Encounter experience with persons and groups.

*227–28 **Advanced Studies in Pastoral Care** (3–3)

History and present state of methodologies and conceptual models of pastoral counseling and leadership in groups; supervised work in interfaith and multidisciplinary ministries.

235 **Seminar: Roman Catholicism in the Modern World** (3) Quitslund

Important leaders and their ideas in selected development since 1500—doctrinal, spiritual, biblical, liturgical, and ecumenical.

237 **Seminar: Theological Analysis** (3) Quitslund

Historical and topical study of the development of important ideas in such areas as Christology, soteriology, and ecclesiology. (Fall)

238 **Seminar: Contemporary Jewish Religious Thought** (3) Staff

Selected topics. (Spring)

241–42 **Seminar: Religious Education** (3)

Major problems in the practice of religious education.

262 **Seminar: History of Eastern Religions** (3) Hiltebeitel

Selected topics.

271 **Seminar: American Religious History to 1830** (3) Wallace

Religious thought and life during the Colonial and early National period. (Fall)

273 **Seminar: American Religious History since 1830** (3) Wallace

Religious thought and life from the Civil War to the present.

291–92 **Readings and Research** (3–3) Staff

Investigation of special problems. (Academic year)

*Offered through the College of General Studies at Off-campus Centers for students in the Master's program in the field of Religion and Medical Care.

299–300 **Thesis Research** (3–3)
(Fall and spring)

Romance Languages and Literatures

Professors J.W. Robb, G.E. Mazzeo, J.A. Frey, J.L. Métivier, Jr., J.F. B
(*Chairman*)
Associate Professors Mary Ann Coffland, Pilar Sáenz, Gregory Ludlow
Assistant Professors Elizabeth Neyman, G.P. Huvé, Julia Hicks, Shirley
nett, Ines Azar, J.M. Thibault, J.M. Tubbs
Adjunct Assistant Professor Mildred Deuel

Bachelor of Arts with a major in (1) *French Language and Literature*
Spanish American Literature, (3) *Spanish Language and Literature,* or (4)
approved combination selected from two of the preceding (*1*), (2), (*3*),
(Field-of-Study).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77. (Students sh
consult the departmental adviser regarding courses to be taken in satisfying
requirements for "meaningful initiation" into the Social Studies and the Natural
Mathematical Sciences.)

2. Prerequisite courses—Fren 1–2, 3–4, 9–10, or equivalent; or Span 1–2,
9–10, or equivalent.

3. Required introductory literature courses—Fren 51–52 or 91–92, or Span 51
or 91–92.

4. Required for the major:

Field-of-Study major—there is no specific program of courses; however,
passing of the major examination is assumed to be a convincing demonstration
the student possesses the breadth, depth, and knowledge of his major in term
semester hours, courses, and grades. A proseminar in each of the major
assists the student in his preparation for the major examination.

Master of Arts in the fields of (1) *French Literature,* (2) *Spanish Amer*
Literature, and (3) *Spanish Literature.*—Prerequisite: the degree of Bachelor
Arts in the appropriate field from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. The program of study co
of 24 semester hours of approved course work plus a thesis (equivalent to
mester hours), or with the approval of the Department a student may elect
program of study consisting of 36 semester hours of approved course work with
a thesis.

Doctor of Philosophy fields of study in Romance Literatures.—Required:
general requirements, pages 93–97, 100–102. There are four fields: French Litera
Spanish Literature; Spanish American Literature; and any approved combination
French, Spanish, or Spanish American Literature.

Bachelor of Arts in Education with teaching fields in French and in Spanish
Prerequisite: the Education curriculum, page 79.

Required: the French option or the Spanish option and the professional cou
listed on pages 114–15, 119, 120–21.

Placement Examinations: A student who has not been granted advanced stand
and who wishes to continue in college the language begun in high school must
a placement examination before registration. Upon completion of the examinat
assignment is made to the appropriate course.

FRENCH

Departmental prerequisite: Fren 3–4 or 6, or equivalent, is prerequisite to all second-group courses in French.

FIRST GROUP

1–2 First-year French (3–3) — Tubbs and Staff

A year course: credit toward a degree at this University given on completion of Fren 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern French prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Fren 1 and 2—fall and spring)

3–4 Second-year French (3–3) — Thibault and Staff

A year course: credit toward a degree at this University given on completion of Fren 4. Conversation, grammar, composition, reading in modern French prose, introduction to French civilization. Aural training, oral practice in language laboratory. Prerequisite: Fren 1–2 or two years of high school French. Laboratory fee, $17.50 a semester. (Fren 3 and 4—fall and spring)

6 Second year French (6) — Thibault and Staff

Lecture (3 hours), discussion (3 hours). Intensive course which covers material of Fren 3–4. Grammar review, reading, conversation. Prerequisite: two years of high school French with grades of *B* or better; Fren 2. Laboratory fee, $17.50 a semester. (Spring)

9 Expression orale du français contemporain (3) — Huvé and Staff

Emphasis on conversation in a controlled situation. Special attention to the acquisition and active use of a flexible vocabulary. Oral reports. Prerequisite: Fren 3–4 or equivalent. (Fall and spring)

10 Cours de Syntaxe (3) — Huvé and Staff

Grammar, writing of exercises, compositions, and translation. Analysis of vocabulary and syntax and their effects in samples of writing. Prerequisite: Fren 3–4 or equivalent. (Fall and spring)

12 French Conversation and Composition (Intensive) (6) — Huvé and Staff

Intensive course which covers material of Fren 9 and 10. Laboratory fee, $25.

49 French for Graduate Students (0) — Staff

For graduate students preparing for reading examinations. No academic credit. Total fee, $295.05 (tuition, $282; University Center fee, $13.05). (Fall and spring)

51–52 Survey of French Literature (3–3) — Métivier and Staff

Readings in French literature from the Middle Ages to the present. Lectures, readings, recitations, and informal discussions. (Fren 51 and 52—fall and spring)

91–92 **Analyse de texte** (3–3) Thibau

Methodology and vocabulary of literary criticism; application of princip of *explication de texte* to selections from prose, drama, and poetry fro the Renaissance to the present. (Academic year)

SECOND GROUP

103 **Diction, Phonétique appliquee** (3) Huv

The sound of French; elements of articulatory phonetics. Exercises reading and speech with attention to pronunciation, accent, rhythm, intonation. (Fall)

108 **Cours de grammaire avancée** (3) Thibau

(Spring)

109 **La Langue pratique** (3) Huvé and Sto

Advanced level study. Practical and everyday vocabularies develop through systematic drills of syntactical patterns. (Fall and spring)

110 **Cours de stylistique** (3) Huvé and Sto

Ce cours permet d'étudier les mots (signification, propriétés, fonctio grammaticales, valeur psychologique, effets sonores, déplacement p sible), et la phrase (les propositions, les rapports qui s'établissent e elles, les modifications qu'elles peuvent subir), ainsi que certains proce stylistiques relevant de la rhétorique. (Fall and spring)

119–20 **French Literature of the Middle Ages and the Renaissance** (3–3) Métiv

Literary history and the development of ideas. *Les chansons de* courtly literature, satire, the theatre, lyric and didactic poetry; Rabel Montaigne, La Pléiade. Class analysis of texts, collateral readings. (Academic year)

121–22 **17th Century French Literature** (3–3) Bu

History, philosophy, criticism, letters, eloquence, drama, fiction, poet Class analysis of texts; collateral readings.

123–24 **18th Century French Literature** (3–3) Ludl

History, philosophy, criticism, letters, drama, fiction, poetry, the "salon idea of progress, idea of science. Class analysis of texts, collateral rea ing. (Academic year)

125–26 **19th Century French Literature** (3–3) Frey, Thibau

Poetry, drama, and novel of the 19th century; emphasis on style analysis. Offered in French, 1975–76 and alternate years; offered in Eng translation, 1976–77 and alternate years. (Academic year)

127–28 **20th Century French Literature** (3–3) Coffland, Thibau

Fiction, poetry, and drama from 1900 to present. Chronological exam tion of authors, movements. Offered in English translation, 1975–76 alternate years; offered in French, 1976–77 and alternate years. demic year)

133 **Seminar: French Literature** (3) Frey

May be repeated for credit. Topic for summer 1975: Contemporary Trends in French Treater. (Summer)

151 **Cinema and Literature—in English** (3) Thibault

May be repeated for credit.

193 **Cours de style** (3) Staff

Advanced grammar, composition, and stylistics. Open to both advanced undergraduate and graduate students. Recommended for majors and teachers of French.

199–200 **Proseminar: Readings for the Major** (3–3) Staff

Conferences and group discussions. (Academic year)

THIRD GROUP

202 **Thème et Version** (3) Staff

Limited to students in the Graduate School of Arts and Sciences; open to others only by permission of the graduate adviser. Required of all graduate students in the field of French Language and Literature. Analysis and translation of selected prose passages, alternating between French and English; designed to teach students to write with precision and clarity. (Fall)

212 **Historical French Grammar** (3) Staff

Phonology, morphology, and syntax of Old French; its development from Vulgar Latin. Prerequisite: a second-group course in French literature. Knowledge of Latin useful.

213–14 **Medieval French Literature** (3–3) Staff

French literature to the end of the Middle Ages. Prerequisite: a second-group course in French literature.

221 **Special Problems in 16th Century French Literature** (3) Burks

May be repeated for credit.

226 **16th and 17th Century Philosophical Literature** (3) Burks

The emergence of a literature of ideas; emphasis on the thought of Calvin, Montaigne, Descartes, and Pascal.

229–30 **Literary Renaissance in Europe** (3–3) Burks

Study of the developments in the poetry of Italy, France, and England. (Academic year)

231–32 **Theatre in the 17th Century** (3–3) Staff

Survey of the development of theatrical arts and the drama. Research papers and reports.

234 **17th Century Nondramatic Literature** (3) Staff

Rationalism and the revolt against authority expressed in literature. Impact of nondramatic literature on the development of classical doctrine.

241 **The Rationalistic Current in the 18th Century** (3)
The contribution of the *philosophes* to the intellectual evolution of Fra
and Europe. (Spring)

242 **Seminar: the French Novel in the 18th Century** (3)
(Spring)

244 **Special Problems in 18th Century French Literature** (3)
May be repeated for credit.

253 **Special Problems in 19th Century French Literature** (3)
May be repeated for credit. Topic for fall: Balzac; topic for spring: Z
(Fall and spring)

256 **19th Century French Literature** (3)

258 **Special Problems in 19th Century French Poetry** (3)
May be repeated for credit.

264 **Seminar: Modern Period** (3)

265 **20th Century French Theatre** (3)
(Fall)

266 **20th Century French Poetry** (3)
Background and development of poetry in the 20th century; *explicat*
de texte approach. (Spring)

295 **Independent Reading and Research in French Literature** (arr.)
For students preparing for the Master of Arts degree. May be repea
for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)
(Fall and spring)

FOURTH GROUP

George Washington University is a member of the Folger Institute of Renaissa
and 18th-century Studies. The policies of the Institute are set by a central co
mittee on which each member institution is represented. Doctoral students enro
in one of the Institute seminars are eligible to apply for fellowship aid, under
grant from the National Endowment for the Humanities. Folger Institute Semin
are numbered 301 through 309. Seminar titles for the 1975–76 academic year
listed below. Students wishing to register for these courses should consult the Cha
man of the Department of Romance Languages and Literatures.

301 **Origins of the Scientific Revolution** (3)
(Fall)

302 **Restoration and 18th-Century Drama** (3)
(Spring)

304 **The Revolution of 1689** (3)
(Spring)

305 **English Renaissance Palaeography** (3) Staff
(Fall)

306 **Shakespeare and the Scholarly Tradition** (3) Staff
(Spring)

307 **Petrarchism and Stoicism in the Renaissance** (3) Staff
(Fall)

308 **Milton in the Context of 17th-Century English Politics** (3) Staff
(Spring)

309 **Dante: A Reading of The Divine Comedy** (3) Staff
(Fall)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

ITALIAN

FIRST GROUP

1–2 **First-year Italian** (3–3) Coffland and Staff
A year course: credit toward a degree at this University given on completion of Ital 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Italian prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Academic year)

3–4 **Second-year Italian** (3–3) Coffland and Staff
A year course: credit toward a degree at this University given on completion of Ital 4. Conversation, grammar, composition, reading of modern Italian prose, introduction to Italian civilization. Aural training, oral practice in language laboratory. Prerequisite: Ital 1–2 or two years of high school Italian. Laboratory fee, $17.50 a semester. (Academic year)

9–10 **Italian Conversation and Composition** (3–3) Coffland
Prerequisite: Ital 4 or equivalent and permission of instructor. (Academic year)

THIRD GROUP

295 **Independent Reading and Research in Italian Literature** (arr.)
For students preparing for the Master of Arts or Doctor of Philosophy degree. May be repeated for credit. (Fall and spring)

PORTUGUESE

FIRST GROUP

31–32 **Intensive Portuguese** (3–3) Ro
Prerequisite: knowledge of one other Romance language. (Acade
year)

SPANISH

Departmental prerequisite: Span 3–4 or 6, or equivalent, is prerequisite to all secon
group courses in Spanish.

FIRST GROUP

1–2 **First-year Spanish** (3–3) Azar and St
A year course: credit toward a degree at this University given on co
pletion of Span 2. For beginners. Pronunciation, conversation, gramm
composition, reading of modern Spanish prose. Aural training, oral pr
tice in language laboratory. Laboratory fee, $17.50 a semester. (Sp
1 and 2—fall and spring)

3–4 **Second-year Spanish** (3–3) Barnett and St
A year course: credit toward a degree at this University given on co
pletion of Span 4. Conversation, grammar, composition, reading of m
ern Spanish prose, introduction to Hispanic civilization. Aural train
oral practice in language laboratory. Prerequisite: Span 1–2 or
years of high school Spanish. Laboratory fee, $17.50 a semester.
(Span 3 and 4—fall and spring)

6 **Second-year Spanish** (6) Neym
Lecture (3 hours), discussion (3 hours). Intensive, accelerated cour
which covers material of Span 3–4. Grammar review, reading, conv
sation. Prerequisite: two years of high school Spanish with grades o
or better, or grade of *A* or *B* in Span 2. Laboratory fee, $17.5
semester. (Spring)

9–10 **Spanish Conversation and Composition** (3–3) Hicks and St
Prerequisite: Span 4 or equivalent and permission of instructor. Stude
who receive credit for Span 9 cannot receive credit for Span 19. (Sp
9 and 10—fall and spring)

12 **Spanish Conversation and Composition (Intensive)** (6) St
Intensive, accelerated course which covers the material of Span 9–
Laboratory fee, $25.

19 **Community Spanish** (3) Barn
Spanish conversation; emphasis on developing linguistic skills necessa
for working with the Spanish-speaking community. Class work supp
mented by work-study program with social agencies within the Spani
speaking community. Admission by permission of instructor. Stude
who receive credit for Span 19 cannot receive credit for Span 9.

49 **Spanish for Graduate Students** (0) Hicks

For graduate students preparing for reading examinations. No academic credit. Tuition fee, Total fee, $295.05 (tuition, $282; University Center fee, $13.05). (Fall and spring)

51–52 **Survey of Spanish Literature and Civilization** (3–3) Barnett

Social, artistic, and cultural background of Spanish literature. Lectures, readings, recitations, and informal discussions. (Academic year)

91–92 **Explicacion de textos** (3–3) Sáenz

Analytical introduction to Spanish and Spanish American literature. Method demonstrated and practiced on selected passages. (Academic year)

SECOND GROUP

109–10 **Advanced Spanish Conversation and Composition** (3–3) Mazzeo

Emphasis on diction and style. Prerequisite: Span 10 or equivalent and permission of instructor. (Academic year)

119–20 **Medieval Spanish Literature** (3–3) Azar

Survey by genre of the literature of the Middle Ages.

121–22 **Spanish Literature of the Golden Age** (3–3) Azar

Span 121: Renaissance and Baroque Spanish poetry, the Spanish *comedia*. Span 122: narrative prose of the Golden Age. (Academic year)

123–24 **Cervantes: Don Quijote** (3–3) Azar

The *Quijote* and the novel as a literary genre: reality and fiction.

125–26 **Modern Spanish Literature** (3–3) Mazzeo

Prose, poetry, and drama of the 18th and 19th centuries. Class analysis of texts, collateral reading, lectures on literature and history.

127–28 **Contemporary Spanish Literature** (3–3) Sáenz

Prose, poetry, and drama of the 20th century. Class analysis of texts, collateral reading, lectures on literature and history. (Academic year)

129 **The Romantic Drama in Spain** (3) Mazzeo

Lectures on the Spanish Romantic drama, class analysis of representative plays, collateral readings.

130 **The Modern Spanish Essay** (3) Mazzeo

Development of the Spanish essay from the 16th century; emphasis on the 18th and 19th centuries. Class analysis of texts, collateral reading, and lectures.

131 **The Generation of 1898** (3) Staff

Study of the various critical problems related to this renaissance of Spanish letters as a whole, and of its most representative figures and works.

135 **The Spanish Theatre of the Realist Period** (3) Barnet

Study and analysis of the works of Ventura de la Vega, López de Ayala, Tamayo y Baus, Echegaray, and Pérez Galdós.

143 **Seminar: Spanish American Literature** (6) Robl

May be repeated for credit. Topic for summer 1975: Highlights of the Spanish American Short Story. (Summer)

151–52 **The Spanish American Novel** (3–3) Robl

Development of the novel in Spanish America. Lectures, collateral reading, and class analysis of texts.

155–56 **Spanish American Literature to 1880** (3–3) Robl

Literature of Spanish America from the colonial period to the latter part of the 19th century. Lectures, collateral reading, reports, and class analysis of important works. (Academic year)

157–58 **Spanish American Literature since 1880** (3–3) Robl

Literature of Spanish America from 1880 to the contemporary period. Lectures, collateral reading, reports, and class analysis of important works.

193 **Curso de estilo** (3) Staff

Advanced grammar, composition, and stylistics. Open to both advanced undergraduate and graduate students. Recommended for majors and teachers of Spanish.

197–98 **Proseminar: Readings for the Major in Spanish American Literature** (3–3) Robl

Recommended for all majors. Conferences and group discussion. (Academic year)

199–200 **Proseminar: Readings for the Major in Spanish Language and Literature** (3–3) Staff

Recommended for all majors. Conferences and group discussion. (Academic year)

THIRD GROUP

215 **Old Spanish Language and Literature** (3) Staff

221 **Seminar: Cervantes' "Don Quijote"** (3) Apri

Cervantes' literary theories, the *Quijote* and its relations with the other *novelas cervantinas* as different modes of representing reality in literary fiction.

224 **Seminar: Special Problems in Spanish Renaissance Literature** (3) Apri

Topic for 1975: Poetry. (Fall)

225 **Seminar: Special Problems in Golden Age Literature** (3) Apri

Topic for 1976: Góngora. (Spring)

231 **Seminar: 18th Century Spanish Writers** (3) Mazzeo
Lectures and analysis of principal authors and works; relationships with subsequent literary movements. (Fall)

242 **Seminar: Spanish Romanticism** (3) Mazzeo
Lectures and analysis of principal authors and works. Collateral readings. Problems of origins and developments. (Spring)

244 **Seminar: Naturalism and the Spanish Novel** (3) Mazzeo
Development of Naturalism in 19th century Spain. Analysis of representative works of Pardo Bazán, Clarín, Blasco-Ibáñez, and others.

246 **Seminar: Works of Galdos** (3) Barnett
Ideological and stylistic analysis: relationship of Galdós' works to literary movements of the second half of the 19th century.

248 **Seminar: Spanish Lyric Poetry of the 20th Century** (3) Sáenz
Stylistic analysis of the most significant poets from 1898 to the present.

250 **Seminar: Novecentismo y Literatura de Entreguerras** (3) Sáenz
The prose writers: intellectualism and new forms of expression. (Spring)

251 **Seminar: Works of Unamuno and Ortega y Gasset** (3) Sáenz
Study of the thought of Unamuno and Ortega y Gasset; analysis and commentary on the texts. (Fall)

252 **Spanish Literature since the Civil War** (3) Sáenz
Development of the Spanish novel in the last thirty years.

253 **Seminar: Studies in Modern Spanish American Poetry** (3) Robb

255 **Seminar: Studies in 20th Century Spanish American Theatre** (3) Robb
(Fall)

256 **Seminar: Studies in Mexican Narrative Prose** (3) Robb

261 **Seminar: Studies in the Spanish American Short Story and Essay** (3) Robb
(Formerly Seminar: Studies in Spanish American Essayists)
The Spanish American short story and essay as artistic forms; selected modern short story writers and essayists. May be repeated for credit.

264 **Seminar: Studies in Recent Spanish American Fiction** (3) Robb
(Spring)

266 **Seminar: Alfonso Reyes** (3) Robb
Alfonso Reyes, the essayist-artist, poet, and complete humanist, as studied in his various prose and poetic works.

287 **Seminar: Problems in Latin American Civilization** (3) Staff
Interdisciplinary seminar partially guided by a specialist within the methodology of his chosen discipline; each student writes a report on

some aspect of a selected key theme. Admission by permission of in structor. (Spring)

295 **Independent Reading and Research in Spanish and Spanish American Literature** (arr.)
For students preparing for the Master of Arts degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Sanskrit

See "Germanic Languages and Literatures."

Scandinavian

See "Germanic Languages and Literatures."

Serbo-Croatian

See "Slavic Languages and Literatures."

Service-Learning Program*

Professor C.C. Mondale
Associate Professor Michael McCally
Assistant Professor Honey W. Nashman, Nathan Garner
Lecturer G.H. Williams

* Administered by the Division of Experimental Programs.

SERVICE-LEARNING EXPERIMENTAL HUMANITIES

SECOND GROUP

151 **Urban Legal Services** (6) — Williams*

Field work and academic study of the urban legal system. Role of urban legal system in promoting humanistic values and enhancing social change. Admission by permission of instructor. (Fall and spring)

152 **Human Resource Issues in Education** (6) — Nashman

Exploration of the effects of education on society and vice versa; opportunities for experience, study, and service in public, private, museum, hospital, and community education centers. Admission by permission of instructor. (Fall and spring)

153 **Issues in American Health Care** (6) — McCally

Field work combined with academic study of present American health care system and its problems: cost, quality of care, delivery of health care, ethical issues, health education, consumer issues, etc. Field placements (12–20 hours a week) in appropriate health-related activities. Admission by permission of instructor. (Fall and spring)

154 **Independent Study** (6) — Mondale

Field work combined with academic study, involving field-placements (12–20 hours a week) and complementary academic program of study, under the supervision of an appropriate faculty member. Students must "contract" with the agency, the faculty member, and the Service-Learning Program. Admission by permission of instructor. (Fall and spring)

155 **The Arts and their Audiences** (6) — Garner

Same as Hum 155. Studies in the purpose and operation of the arts organizations in Washington. Weekly seminars and placement in an internship in an arts organization. Discussion topics focus on the process of communication between artists and the public, the government, and the business community. Open to students with a demonstrated interest in the arts and the maturity to perform in a responsible position in an arts organization. (Fall and spring)

SERVICE-LEARNING POLITICAL SCIENCE

SECOND GROUP

154 **Law and Social Change** (6) — Williams*

Study of the legal system and its role in promoting social change. Readings, group discussions, and work with lawyers and 3rd-year law students. (Fall and spring)

155 **American Political Behavior** (6) — Staff

Internship in a variety of lobbying groups. Analysis of the structural and behavioral limitations which confront those who wish to exercise political influence. (Fall and spring)

*Gregory Howard Williams is Lecturer in Law in the National Law Center.

Sino-Soviet Studies

See "Institute for Sino-Soviet Studies."

Slavic Languages and Literatures

Professor Helen Yakobson
Associate Professors Nadine Natov, C.A. Moser, G.A. Olkhovsky (*Chairma*
W.W. Rowe, Irene Thompson
Associate Professorial Lecturer Juri Jelagin
Adjunct Assistant Professor Mary Miller
Assistant Professorial Lecturer Natalia Simes
Lecturer Sharron Bickel

Bachelor of arts with a major in Russian Language and Literature (Field-of-Stu or *Departmental).*—The following requirements must be fulfilled.

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—Slav 5–6 (preferred), or Slav 1–2, 3–4; or equivale and Slav 91–92.
3. Required for the major.

Field-of-Study major—By the end of the senior year the student will be expect to have a reasonable command of language skills and a grasp of the fundamentals Russian structure, as well as a good foundation in Russian literature and cult The passing of a major examination during the senior year is required. The Depa ment provides a proseminar to assist the student in his preparation for the ma examination.

Departmental major—from 30 to 36 semester hours of course work in the D partment of Slavic Languages and Literatures distributed as follows: Language 9 to 12 hours chosen from Slav 7–8, 9–10, 101, 103, 104, 109–10, 197, 198; guistics—3 hours chosen from Slav 185 or 186; Culture and Civilization—6 ho chosen from Slav 161–62, 172; Literature in Russian—6 hours chosen from S 141–42, 146, 152; Literature in English Translation—6 to 9 hours chosen fr second-group courses.

A student who is already proficient in Russian language or literature may, up passing an appropriate examination, waive any or all of the first-group language literature courses, as well as up to 6 semester hours of second-group courses.

Bachelor of Arts with a major in Russian Literature and Culture—in Translati (Field-of-Study).—The following requirements must be fulfilled.

1. The general requirements as stated on pages 76–77, 83–89.
2. Prerequisite courses—Slav 47 and 49, or Slav 1–2 and 3–4, or equivalent; a Slav 91–92.
3. By the end of the senior year the student will be expected to have a go grasp of Russian literature and the principles of literary criticism, as well as general knowledge of Russian culture and history. The passing of a major examin tion during the senior year is required. The Department provides a proseminar assist the student in his preparation for the major examination.

A student who is already proficient in Russian language or literature may, up passing an appropriate examination, waive any or all of the first-group language literature courses, as well as up to 6 semester hours of second-group courses.

Master of Arts in the field of Russian Language and Literature.—Two areas concentration are offered: Russian language and literature and Russian language linguistics.

Prerequisite: the degree of Bachelor of Arts with a major in Russian Language and Literature or Russian Literature and Culture—in Translation from this University, or an equivalent degree. A student planning a concentration in Russian language and literature must have a general proficiency in the Russian language, a general knowledge of Russian literature, and an acquaintance with Russian history and culture. A student planning a concentration in Russian language and linguistics must have a general proficiency in the Russian language, a general knowledge of its structure, and an acquaintance with general linguistics.

Required: the general requirements, pages 93–100. The program of study consists of 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours) or 30 semester hours of approved course work without a thesis. Candidates electing the Russian literature concentration must include 6 semester hours of linguistics and at least 18 hours of literature; candidates electing the Russian language concentration must include 6 semester hours of literature and at least 18 hours of language and linguistics. All candidates must pass a reading knowledge examination in either French or German and must pass a Master's Comprehensive Examination in their area of concentration.

Bachelor of Arts in Education with a teaching field in Russian.—Prerequisite: the Education curriculum, page 79.

Required: the Russian option and the professional courses listed on pages 118–19, 120–21.

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

FIRST GROUP

1–2 **First-year Russian** (3–3) Yakobson and Staff

Beginners' course in fundamentals of grammar and pronunciation. Slav 1 is prerequisite to Slav 2. Laboratory fee, $17.50 a semester. (Slav 1 and 2—fall and spring)

3–4 **Second-year Russian** (3–3) Yakobson and Staff

Intermediate course in Russian language. Prerequisite to Slav 3: Slav 1–2 or two years of high school Russian. Prerequisite to Slav 4: Slav 3. Laboratory fee, $17.50 a semester. (Academic year)

5–6 **Intensive Beginning Russian** (6–6) Thompson and Staff

Classroom (6 hours), laboratory (1 hour). Beginners' intensive course in the fundamentals of Russian. Prerequisite to Slav 6: Slav 2 or 5. Laboratory fee, $17.50 a semester. (Academic year)

9–10 **Intermediate Russian Conversation and Composition** (3–3) Yakobson

Listening comprehension; oral and written practice. Prerequisite: Slav 4 or 6, or permission of instructor. (Academic year)

31–32 **Elementary Polish** (3–3) Staff

Beginners' course in the fundamentals of grammar and pronunciation. Slav 31 is prerequisite to Slav 32. Laboratory fee, $17.50 a semester.

41–42 **Elementary Serbo-Croatian** (3–3) St

Beginners' course in the fundamentals of grammar and pronunciati Slav 41 is prerequisite to Slav 42.

47 **Beginning Russian for Reading** (3) Mil

For students with little or no knowledge of Russian who wish to le to read the language only. Credit assigned only after completion of S 49. No academic credit for graduate students. (Fall)

49 **Russian Reading** (3) Mil

Primarily for graduate students preparing for reading examinations the natural and social sciences. No academic credit for graduate st dents. Prerequisite: Slav 47 or equivalent. (Spring)

71 **Introduction to Russian Civilization** (3) Olkhovsk

Survey of Russia's artistic, social, and cultural development. Lecture discussion, visual aids—in English. (Fall)

91–92 **Introduction to Russian Literature** (3–3) Row

Emergence and development of Russian literature and ideas during th 19th and early 20th centuries—in English. (Academic year)

SECOND GROUP

101 **Readings in the Soviet Press** (3) Staf

Representative reading and translation of Soviet periodicals and curren publications in social sciences. Prerequisite: Slav 4, 6, 49, or permission o instructor. (Fall)

103 **Scientific Russian** (3) Staf

Representative readings in the major fields of Russian contemporary scie tific literature. Prerequisite: Slav 4, 6, 49, or permission of instructor. (Spring 1976 and alternate springs)

104 **Business Russian** (3) Staf

Study of Russian business vocabulary and concepts of business in the Soviet context. Prerequisite: Slav 4, 6, 49, or permission of instructo (Spring 1977 and alternate springs)

109–10 **Advanced Russian Conversation and Composition** (3–3) Yakobso

Developing proficiency in oral and written expression. Prerequisite: Sla 10 or equivalent. (Academic year)

128 **Dostoevsky, the Man and the Artist** (3) Nato

Sources and development of Dostoevsky's philosophical, religious, and ae thetic ideas. His influence on Russian and Western literature. Lecture discussions, and reports—in English. (Fall)

141–42 **19th Century Russian Literature** (3–3) Staf

(*Formerly Russian Romanticism and Realism*)

Major Russian writers and literary trends from the end of the 18th cen tury to Chekov; fiction, poetry, drama—in Russian. Prerequisite: Slav or 6, or equivalent. (Academic year 1976-77 and alternate years)

143–44 **The Russian Novel** (3–3) Moser

Study of representative novels of the 19th and 20th centuries—in English. (Academic year 1975-76 and alternate years)

146 **The Russian Short Story** (3) Natov

Historical development of the Russian short story. Lectures, reports, and class analysis—in Russian. (Spring 1976 and alternate springs)

151–52 **20th Century Russian Literature** (3–3) Natov

(*Formerly Slav 151 Russian Symbolism [3] and Slav 152 Russian Literature after the Revolution [3]*)

Various trends in Russian literature since the beginning of the 20th century. Masterpieces of Russian poetry, prose, and drama—in Russian. Prerequisite: Slav 4 or 6, or equivalent. (Academic year 1975-76 and alternate years)

153 **Turgenev** (3) Moser

Reading and discussion of Turgenev's works. Emphasis on the novels; major short stories analyzed and some time spent on his plays and other prose works—in English. (Fall 1975 and alternate falls)

156 **Leo Tolstoy, His Life and Works** (3) Rowe

Evolution of Tolstoy's artistic and philosophical ideas. Tolstoy's impact on Russian literature and society. Lectures, reports, and classroom analysis of his major works—in English. (Spring)

157 **Nabokov** (3) Rowe

Reading and discussion of the major creative works. Russian roots, ordering of reality, sexual symbolism—in English. (Fall)

158 **Solzhenitsyn** (3) Natov

Reading and discussion of the most important stories, novels, and plays by the outstanding contemporary Russian writer—in English. (Spring)

161–62 **Russian Culture** (3–3) Olkhovsky

Survey of Russian cultural heritage from origins of ancient Russia to present—in English. Lectures, discussion, reports. (Academic year)

165 **Soviet Literature from the Revolution to World War II** (3) Staff

Basic themes, issues, literary figures of the Soviet 1920s. The fate of literature and writers under increasing state control; Five-year Plan literature. Lectures, discussion, reports—in English. (Fall)

166 **Soviet Literature from World War II to the Present** (3) Staff

Literature in wartime, under Stalinism, and in the "thaws." The new generation of dissident liberal and "underground" literature. Lectures, discussion, reports—in English. (Spring)

172 **Soviet Dissent** (3) Olkhovsky

Examination of artistic and intellectual dissent since the death of Stalin; underground press, songs, plastic arts—in English. (Spring)

185 **Russian Linguistic Structure I: Phonology and Morphology** (3) Thomp
(Formerly Slav 125 Russian Linguistic Structure)
Linguistic description of the phonology and morphology of standard c temporary Russian.

186 **Russian Linguistic Structure II: Syntax, Lexicon, and Semantics** (3) Thomp
(*Formerly Slav 126 Contrastive Russian-English Analysis*)
Linguistic description of the syntax, lexicon, and semantics of stand contemporary Russian. (Spring)

191 **Russian Literature to 1800** (3) Mo
Survey of Russian literature from the earliest times to the end of the century—in English.

193–94 **The Other Slavs: Their Literature—in English** (3–3) Sc
An examination of non-Russian Slavic literatures from their beginning the present day. Emphasis on themes, ideas, and styles peculiar to e literature. (Academic year)

197 **Methodology of Teaching Russian** (3) Yakob
Discussion of methods, examination of textbooks, observation of cl room procedures. Prerequisite: 18 semester hours of Russian langua (Fall 1976 and alternate falls)

198 **Russian Stylistics** (3) Na
Development of the Russian language, literary styles, and techniqu words and their aesthetic value, phraseological units, word order, phra structure. (Spring 1977 and alternate springs)

199–200 **Proseminar: Readings for the Major** (3–3) Sp
Conferences and group discussions. (Academic year)

THIRD GROUP

215 **History of the Russian Language** (3) Thomp
Historical phonology, morphology, and syntax of the Russian langua (Fall 1975 and alternate falls)

216 **Comparative Slavic Structure** (3) Thomp
Study of the structure of Slavic languages other than Russian. Knowled of a Slavic language other than Russian is helpful, but not requir (Spring 1976 and alternate springs)

225 **Pushkin and the Poets of His Time** (3) Na
Pushkin's predecessors; Pushkin's lyrics and dramas. Lermontov—the P to Pushkin's poetic tradition. (Fall 1975 and alternate falls)

253 **Seminar: Literary Criticism** (3) Na
Study of leading Russian critics and their role in the development of R sian literature; the emergence of various literary schools. (Spri 1976 and alternate springs)

254 **Seminar: Literary and Intellectual Currents of the 1860s** (3) Moser

Discussion of literary and intellectual developments in the Russia of the 1860s. Course conducted in English; a reading knowledge of Russian required. (Spring 1977 and alternate springs)

255 **Seminar: Main Trends in 20th Century Russian Literature** (3) Natov

Study of representative works since 1900; their artistic and social value—in Russian. (Fall 1976 and alternate falls)

295 **Independent Reading and Research** (arr.) Staff

For students preparing for the Master of Arts degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

Sociology

Professors R.W. Stephens, I.H. Cisin, R.G. Brown (*Chairman*), T.F. Courtless, Jr.

Associate Professors Patricia Lengermann, Ruth Wallace

Assistant Professors Phyllis Stewart, William Martineau, J.L. Tropea, Margaret Boeckmann

Adjunct Assistant Professor Eileen Zeitz

Assistant Professorial Lecturers W.R. Throckmorton, B.B. Dunning

Bachelor of Arts with a major in Sociology (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding course to be taken in satisfying the requirement for "meaningful initiation" into the Humanities and the Natural and Mathematical Sciences.)
2. Prerequisite courses—Soc 1 and 2.
3. Required courses in related areas—3 semester hours in Statistics (students should consult the departmental adviser regarding the appropriate course); 12 semester hours in *one* of the following related social science fields: Anthropology, Economics, Geography, History, Political Science, and Psychology.
4. Required courses in the major—Soc 101, 141, 149; 15 additional semester hours in second-group Sociology courses.

Master of Arts in the field of Sociology.—Prerequisite: a Bachelor's degree with a major in Sociology or in an approved related field. Applicants should present scores on the Graduate Record Examination, especially in the Verbal and the Quantitative Tests, Test in Sociology, and arrange for former professors to write letters of reference to the Graduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. The minimum requirement consists of 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours). All candidates must include in their program of study Stat 105; graduate Sociology courses selected from the following areas: 6 hours chosen from

Sociological Theory (Soc 238 and 239 recommended), 6 hours chosen from Soci... Research Methods, and 6 hours chosen from one of the Department's substant... special fields (Deviant Behavior, Political Sociology, Sociology of Work, or Urba... Sociology). All candidates must satisfactorily complete a Master's Comprehensiv... Examination in Sociological Theory and Social Research Methods, and mus... complete and orally defend a thesis. Candidates must also fulfill the tool requiremen... by passing a reading knowledge examination in one foreign language or by satis... factorily completing the tool requirement in either Statistics or computer program... ming.

Doctor of Philosophy in the field of Sociology.—Required: the general require... ments, pages 93–97, 100–102. Students must complete from 30 to 36 semester hours o... graduate course work, and from 12 to 18 semester hours of Dissertation Research... for a total of 48 hours beyond the Master's degree. Students must include in the... program of study graduate course work in each of the following: 6 semester... hours of Sociological Theory (including Soc 333), 6 hours of Social Research... Methods, and 6 hours each in two substantive specialties, at least one of which... must be chosen from among those offered by the Department of Sociology—... Deviant Behavior, Political Sociology, Sociology of Work, and Urban Sociology. Stu... dents must satisfactorily complete the General Examination in Sociological Theory... Social Research Methods, and two substantive specialties. Students must also fulfill... the tool requirement by passing a reading knowledge examination in one foreign... language and by satisfactorily completing the tool requirement in either Statistics... or computer programming.

Departmental prerequisite: Soc 1 is prerequisite to all second- and third-group... courses in Sociology except for Soc 181 and 191.

SOCIOLOGY

FIRST GROUP

Staff

1 Introductory Sociology (3)

General principles of sociology; development of culture and personality; impact of groups and institutions on man's social behavior. (Fall and spring)

Staff

2 Uses of Sociology (3)

Introduction to the various methods by which sociologists have approached the investigation of social phenomena. Prerequisite: Soc 1. (Fall and spring)

SECOND GROUP

101 Development of Social Thought (3) Lengermann, Stephens

Examination of concepts and theories relevant to the nature of society and human relationships from ancient writings to the 20th century. Prerequisite: Soc 1. (Fall and spring)

Brown

110 The Sociology of Work (3)

Introductory survey of industrial sociology; sociology of occupations and professions; industry-community relations; and analysis of large, complex organizations. (Fall)

124 **Medical Sociology** (3) Brown

Social factors and processes related to the etiology and treatment of physical and mental illness; medical occupations and professions, medical organizations, problems of delivery of health care services. (Fall)

125 **Sociology of Religion** (3) Wallace, Yeide

Introduction to history of the religious area of sociology; analysis of reciprocal impact of secular upon religious and religious upon secular institutions. (Fall)

126 **Urban Sociology** (3) Martineau, Stephens

Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburban development. (Fall)

127 **Population Problems** (3) Stewart

Composition of populations, trends in population growth and population pressure, factors producing population movements, effects of migration, population policies—eugenics and birth control. (Fall)

128 **Urban Problems and Policies** (3) Martineau

Seminar on urban problems and policies developed in response to them; special focus on Washington, D.C.; students placed in Washington agencies; seminar sessions devoted to social-policy analyses of their experiences. (Spring)

129 **Race and Minority Groups** (3) Wallace

Analysis of relationships between dominant and minority groups in society, particularly in the United States; nature and range of problems; analysis of the phenomenon of prejudice. (Spring)

130 **Class, Status, and Power** (3) Stephens

Analysis of distribution of resources and opportunities for participation, education, and social mobility in American society; international comparisons; analysis of public policies which affect these distributions. (Fall)

132 **Political Sociology** (3) Lengermann, Martineau

Analysis of problems involved in the study of power relations in society; distribution of power in society; types and processes of government; political participation and political mobilization. (Fall)

133 **Sociology of Education** (3) Tropea, Wallace

Analysis of educational systems from institutional perspectives and as agencies of socialization; relationships of education in general to society, including technological, communal, and subcultural components. (Spring)

135 **Juvenile Delinquency** (3) Courtless, Tropea

Factors producing delinquency, juvenile detention, the juvenile court, training schools, treatment of offenders. (Spring)

136 **Criminology** (3) Courtless, Tropo

Nature and distribution of crime as related to the development and opera tion of criminal law and various social and legal institutions in urba society. (Fall)

137 **Sociology of Law** (3) Courtle

Law as a social phenomenon and agency of social control. Problems o legal concepts, doctrines, and institutions. Prerequisite: Soc 136. (Fall)

139 **Society and the Deviant** (3) Throckmorton, Tropo

Analysis of relationships of society, socialization, and deviancy. Social re sponses to deviancy and criminal offenders; rehabilitative programs a community, courts, and schools. (Spring)

141 **Social Research Methods** (3) Courtless, Cle

Introduction to scientific method in the development of social theory an the solution to social problems. Prerequisite: Stat 53. (Fall an spring)

Stat

143 **Social Movements** (3)

General survey of the various forms of collective behavior (fads, panics riots, social movements, etc.), and a more detailed study of the genesis development, and decay of social movements and social revolutions (Spring)

Cle

144 **Public Opinion and Mass Communication** (3)

Communication process with emphasis on international communications propaganda, and mass media; measurement of propaganda campaigns (Fall)

Stewar

147 **Problems of Bureaucratic Organization** (3)

Analysis of theories of and behavior in large, bureaucratic organizations and their impact on American social life. Supervised work-practice in the Washington, D.C., community. (Spring)

Wallace

149 **Modern Sociological Theory** (3)

Systematic study of contemporary schools of sociological theory, both European and American development; evaluation of scientific contribu tions of each school. Prerequisite: Soc 101. (Fall and spring)

Tropo

151 **Problems of Urban Social Systems** (9)

Developing a comprehensive perspective on selected social problems through lectures and readings. Topic changes each semester. Prerequisite: 24 semester hours selected from economics, history, political science psychology, and sociology. Admission by permission of instructor. Con current registration in Soc 152 required. (Fall and spring)

Tropo

152 **Problems of Urban Social Systems—Supervised Field Work** (6)

Accompanies Soc 151. A maximum of 24 hours a week will be spent in service-research efforts by placement in the Washington, D.C., area. Con current registration in Soc 151 required. (Fall and spring)

*153 **Poverty in America** (3)

Exploration of social and economic causes of poverty in the United States and evaluation of anti-poverty strategies, including comprehensive welfare reform. Discussion of conflicts between sociological and economic models of behavior of low income groups.

181 **Major Social Processes** (3) Staff

Analysis and examination of various processes in society of general importance to the field of sociology, e.g., social conflict, socialization, social change, etc. Topic changes each semester; may be repeated for credit. Admission by permission of instructor. (Fall and spring)

191 **Current Emphases in Sociology** (3) Staff

Analysis and evaluation of recent developments in the general field of sociology. Topic changes each semester; may be repeated for credit. Admission by permission of instructor. (Fall and spring)

195 **Research** (3) Staff

Independent study and special projects. Open only to selected undergraduate students with promising academic records. Before a student is permitted to register for Soc 195, he must submit a written proposal of his plan of study for the approval of the Staff member of the Department who will be directing his research. (Fall and spring)

THIRD GROUP

203 **Social Organization** (3) Wallace

Introduction to sociological concepts and perspectives on society as a system of institutions. Recommended for students offering sociology as a supporting field. (Fall)

210 **Theoretical Foundations of Political Sociology** (3) Lengermann

Sociological theory on the relationship of politics to the wider social system. Emphasis on concepts of power, alienation, ideology, political stability, conflict, and change. (Fall)

212 **Seminar: Political Processes** (3) Lengermann, Boeckmann

Sociological studies of political process in the United States; distributions of power; political socialization, attitudes, participation, communication; social movements. Prerequisite: Soc 210. (Spring)

220 **Religious Institutions in Urban America** (3) Yeide

Structural variety of religious institutions and patterns of interaction between religious and secular institutions in contemporary urban life. (Spring 1977 and alternate springs)

223 **Urban Sociology** (3) Martineau

Sociological perspectives on urbanization and urbanism and on the determinants of the forms and structure of the city. (Fall)

* Interdepartmental course offered by the departments of Sociology and Economics.

224 **Urban Life** (3) Martine

Examination of differentiation—social, cultural, areal; life styles, ter torial groupings, community participation. Prerequisite: Soc 223. (Spring)

230 **Sociological Research Methods** (3) Cis

Systematic survey of sociological research strategies and review of th literature in this area. Recommended for students with only one under graduate course in research techniques. Prerequisite: Soc 141 or equiv lent. (Fall)

231 **Seminar: Advanced Research Methods** (3) Cis

Intensive study and evaluation of a few sophisticated research techniqu and of new developments in the methodology of social research. Pre requisite: Soc 230 or equivalent. (Spring)

232 **Seminar: Research Planning and Execution** (3) Cisin, Stewa

Clinical review of student research projects; recommended for students engaged in thesis and dissertation research. Prerequisite: Soc 230 o equivalent. (Spring)

235 **Seminar: Sociology of Education** (3) Ste

Sociological theories on relationships between education and the economi political, social, and cultural character of society; examination of socia factors relating to such topics as educational achievement, the changi functions of educational structures, and the roles of teacher and studen (Fall 1976 and alternate falls)

238 **Seminar: Development of Sociological Theory** (3) Lengerma

Development of sociology from the early 1800's to the 1920's. Intensiv analysis of the classical theoretical statements. (Fall)

239 **Seminar: Modern Sociological Theory** (3) Lengermann, Walla

Intensive examination and evaluation of contemporary schools of socio logical theory in Europe and America. Advanced analysis of theoretica perspectives. Prerequisite: Soc 238. (Spring)

240 **Sociology of Work and Occupations** (3) Stewart, Brow

Analysis of occupational roles and structures; recruitment and training adjustment problems at various career stages; interrelationships of strat ification, life styles, and work roles. (Fall)

241 **Sociology of Work and Organizations** (3) Stewart, Brow

Theory of complex organizations relative to work in industry, govern ment, and business; examination of basic processes such as decision making, recruitment, allocation of authority, informal organization, an interorganizational relations. (Spring)

242 **Seminar: Urban Medical Systems** (3) Brow

Sociological analysis of various problems in urban medical systems, ed delivery of health care services, interprofessional relationships, communit health care, etc. (Spring)

*259 **Law and Criminology I: Search for the Causes of Criminal Behavior** (3) (Same as Law 475 (2)) Courtless

*261 **Law and Criminology II: Society's Responses to the Criminal Offender** (3) (Same as Law 476 (2)) Courtless

263 **Seminar: Law and Society** (3) Courtless

Selected problems in law as an instrument of social policy; emphasis on the organization of legal-decision-making processes. (Spring)

265 **Seminar: Criminal and Juvenile Justice Systems** (3) Courtless, Tropea

Development of a systematic perspective on components and relationships constituting the juvenile and criminal justice systems. (Spring)

295 **Research** (arr.) Staff

Independent study and special projects. Before a student is permitted to register for Soc 295, he must submit a written proposal of his plan of study for the approval of the Staff member of the Department who will be directing his research. May be repeated once for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

333 **Seminar: Theory Construction and Application** (3) Tropea, Wallace

Critical examination of the elements of current theories in the social sciences with the major objective of developing general principles of theory construction; consideration of the functions of theory in sociological research. (Fall)

351 **Selected Topics in Sociology** (3) Staff

Intensive investigation of special topics in sociology. May be repeated for credit. The following topic(s) will be offered as the demand requires each fall semester: (1) *Social Research*—causal inference in social research, evaluation research, philosophy of science, etc.; (2) *Political Sociology*—comparative political structures, processes of policy formation, social movements, etc.; (3) *Sociology of Work*—work and public bureaucracies, industrial sociology, etc.

352 **Selected Topics in Sociology** (3) Staff

Intensive investigation of special topics in sociology. May be repeated for credit. The following topic(s) will be offered as the demand requires each spring semester: (1) *Sociological Theory*—study of important theorists such as Marx, Weber, Parsons, important themes such as social change, social control; important schools such as symbolic interactionism, general systems theory. (2) *Urban Sociology*—ecological processes, suburbanization, the urban school, race and ethnic relations, etc.; (3) *Law and Society*—the police and the community, the sociology of law, theories of deviance, etc.

* Students registering for Soc 259 or 261 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. For description of the courses, see the *National Law Center* catalogue.

398 **Advanced Reading and Research** (arr.) Staf
Limited to students preparing for the Doctor of Philosophy general exam
ination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staf
Limited to Doctor of Philosophy candidates. May be repeated for credi
(Fall and spring)

Spanish

See "Romance Languages and Literatures."

Special Education

Professor Perry Botwin (*Chairman*)
Associate Professors R.S. Cottrell, Jr., Rita Ives
Assistant Professors R.W. Prouty, J.R. Shotel, M.S. Castleberry, Linda Tsan
Instructors Joan Landy, Nancy Sobel

Programs of study in Special Education leading to the degrees of *Bachelor of Ar in Education, Master of Arts in Education,* and *Doctor of Education* are offered b the School of Education (see pages 105–32).

SECOND GROUP

Staf
101 **Seminar: Dimensions of the Complementary Teaching Role** (3)
Instructional experiences designed to refine the insights and competencies essential for successful operation of the complementary teaching mode (Fall)

Staf
102 **Teaching the Child with Special Needs: Methods and Materials** (3)
Laboratory course taught in an elementary public school. Students ob serve and participate in a demonstration seminar conducted by the in structor. Must be taken concurrently with SpEd 189. (Fall)

Staf
103 **Teaching the Child with Special Needs: Creative Programming** (3)
Continuation of SpEd 102. Concentration on the total programming o the child with special needs. Must be taken concurrently with SpEd 19 (Spring)

170 **Interpersonal/Intrapersonal Relationships for Special Education Teachers** (3) Staff

Consideration of factors leading to successful interaction with children. (Fall)

189 **Preprofessional Internship: Observing the Special Child in the Regular Class Milieu** (3) Staff

Supervised internship in school setting. Emphasis on intensive study of a child evidencing special needs. Must be taken concurrently with SpEd 102. (Fall)

190 **Preprofessional Internship: Inspecting a Continuum of Special Education Services** (3) Staff

Observation and participation in various special education settings. Emphasis on exposure to and familiarity with goals and programs of various special education models. Must be taken concurrently with SpEd 103. (Spring)

197–98 **Special Study in Special Education** (3–3) Staff

Individual or group study or research under the guidance of staff members. Program and conferences arranged with adviser. Admission by permission of adviser. (Academic year)

199 **Internship in Complementary Teaching** (6) Staff

Supervised teaching internship in a school-based intervention program. Student teaching with children identified as needing special education services. A minimum of 210 clock hours required. Admission by permission of the instructor.

200 **Understanding Young Exceptional Children** (3) Staff

Lecture and field experience. Application of the basic concepts of early child development as applied to special education. (Fall)

THIRD GROUP

201 **Introduction to Special Education** (3) Botwin

Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accomodate children in a school program. (Fall)

222 **Special Education in the Regular Classroom** (3) Landy

Special techniques and materials for regular classroom teachers to assist children who have learning and/or behavior problems; emphasis on specific, practical strategies and applications. Open to undergraduate seniors. (Spring)

240 **The Crisis-Resource Teacher** (3) Staff

Rationales, operational models, techniques, and problems relevant to the implementation of crisis-resource teacher programs. (Fall)

241 **Preprofessional Internship: Crisis-Resource Teaching** (6) Staff

Practicum experience early in the training sequence in crisis-resource

teaching. Under the direction of qualified teachers in a field setting. A minimum of 280 clock hours required. (Fall)

242 **Specialized Techniques and Materials for Crisis-Resource Teachers** (3)

Lectures, discussions, techniques, and selected materials exploring psycho-educational factors used in crisis-resource teaching. Admission by permission of instructor. (Fall)

250 **Specialized Techniques and Materials for Diagnostic-Prescriptive Teachers** (3)

Selected materials and techniques used in diagnostic-prescriptive teaching. Must be taken concurrently with SpEd 252. Admission by permission of instructor. (Fall)

251 **Psychosocial Factors in Special Education** (3)

Psychosocial factors significant to the process of the special educator/school based consultant. Admission by permission of instructor. (Fa

252 **Preprofessional Internship for Diagnostic-Prescriptive Teachers** (6) Landy and St

Supervised school experience in diagnostic-prescriptive teaching. Must be taken concurrently with SpEd 250. Admission by permission of instructor. A minimum of 280 clock hours required. (Fall)

253 **The Humanizing Curriculum and the Special Education Consultant** (3)

Curriculum concepts and modifications aimed at enhancing the classroom environment for learning and growth. Admission by permission of instructor. (Fall)

260 **The Assessment Process: Identification and Psycho-educational Assessment of Young Exceptional Children** (3) Castleberry, Tsanti

Lectures, demonstrations, and clinical practice in formal and informal assessment procedures. Admission by permission of instructor. (Fa

261 **The Teaching/Learning Process: Methods and Materials for Young Exceptional Children** (3) Ives, Tsant

Clinical practice in the designing of educational strategies and materials taught in a special education setting. Admission by permission of instructor. (Fall)

262 **Seminar: the Education of Young Exceptional Children** (3) Ives, Castleberry, Tsantis, Sobel, Shot

Weekly seminar dealing with experiences, problems, and concerns encountered during the internship for the education of young exceptional children. Must be taken concurrently with SpEd 292. Admission by permission of instructor. (Spring)

263 **Introduction to the Education of the Severely and Multiply Handicapped** (3) Sobe

Survey of the characteristics and learning patterns of children with severe disabilities. Lecture and field experience. (Fall)

264 **Advanced Study in the Special Education of Severely and Multiply Handicapped Children** (3) — Staff

Specialized programs, techniques, and methods for teaching children with severe disabilities. (Spring)

265 **Clinical Experience with Multiply Handicapped and Developmentally Disabled Young Children** (3) — Ives

Preliminary field experience designed for students with no experience in early childhood special education. Supervised experience necessary for program articulation. Three week intensive involvement in an early childhood special education setting.

266 **Problems in Language Development in Exceptional Children** (3) — Castleberry

Introduction to the study of language acquisition and the application of current research on language of handicapped children. (Fall)

267 **The Role of the Early Childhood Special Educator** (3) — Tsantis

Examination of the spectrum of roles available in early childhood special education; emphasis on role expectations and psychosocial dynamics of the various settings. (Spring)

268 **The Development of Young Exceptional Children with Emphasis on Handicapping Conditions** (3) — Sobel

Lecture (2 hours), site visitation (3 hours), discussion (2 hours). (Fall)

269 **Psychosocial Concerns of the Early Childhood Special Educator** (3) — Ives, Tsantis

Seminar involving student presentations focusing on sociological and psychological constructs relevant to interpersonal/intrapersonal relationships. (Fall)

270 **Adapting the Early Childhood Curriculum to Meet Special Needs** (3) — Sobel

Review of the basic curriculum areas as they relate to the development of readiness skills in special education. (Spring)

271 **The Interdisciplinary Approach to Planning for the Severely and Multiply Handicapped** (3) — Staff

Laboratory experience in which students participate as educational members of an interdisciplinary team. (Spring)

273 **Seminar for Special Education Strategist Intern** (3) — Staff

Weekly seminar dealing with experiences, problems, and concerns encountered during special education early childhood strategist internship. Concurrent enrollment in SpEd 293 required. (Spring)

290 **Control and Management Techniques in the Classroom** (3) — Staff

Examination of the theory, techniques, and tools essential for group con-

trol. Designed to provide practice as well as familiarity with the various theories of control of human behavior. Admission by permission of instructor.

291 **Practicum in Crisis-Resource Teaching** (9) Staff

Supervised field experience in the crisis-resource teacher program. Under the direction of a qualified teacher and the supervision of the University staff. Minimum of 420 clock hours required. (Spring)

292 **Professional Internship in Education of Young Exceptional Children** (9) Ives, Tsantis, Castleberry, Sobel, Shotts

Supervised internship in the education of young exceptional children. A minimum of 420 clock hours required. Must be taken concurrently with SpEd 262. (Spring)

293 **Professional Internship for the Special Education/Early Childhood Strategist** (9) Ives, Tsantis, Castleberry, Sobel, Shotts

Supervised internship in strategist role, emphasizing diversified, multidimensional aspects of a special education/early childhood program. A minimum of 420 clock-hours is required. Concurrent enrollment in SpEd 273 required. (Spring)

294 **Practicum in Diagnostic-Prescriptive Teaching** (9) Landy and Staff

Supervised field experience in diagnostic-prescriptive teacher programs. A minimum of 420 clock hours required. Admission by permission of instructor. (Spring)

297–98 **Individual Study in Special Education** (3–3) Staff

Individual study or research under guidance of staff member. Programs and conferences arranged with adviser. Admission by permission of adviser. (Academic year)

303 **Administration and Supervision of Special Education** (3) Bowie

Philosophy and nature of special education; litigation, program organization, administration, and development. Surveying local-level needs; program evaluation and supervision. Admission by permission of instructor. (Spring)

304 **Recent Research and Trends in Special Education** (3) Staff

Emphasis on research methodology and considerations. The unique problems of doing research in special education. Procedures and sources for obtaining research funding. Admission by permission of instructor. (Fall)

306 **The Design of Family Education Programs: Theory and Practice** (3) Ives, Castleberry

Theoretical foundations and clinical practice in working with parents and community agencies in meeting the educational needs of young exceptional children. (Spring)

350 **The Diagnostic-Prescriptive Teacher** (3) Landy

Rationale, operational models, techniques, and problems relevant to the implementation of diagnostic-prescriptive teacher programs. Admission by permission of instructor. (Fall)

351 **Seminar: School-based Consultants in Special Education** (3) Landy

Current practices in regular and special education as they affect the school-based coonsultant; emphasis on concurrent field experience. Admission by permission of instructor. (Spring)

352 **Seminar: Special Education Consultant Programs in the Schools** (3) Staff

For school-based consultants in special education; focuses on in-school program development and recent trends in processes and procedures. Admission by permission of instructor. (Fall)

370 **Intrapersonal Dynamics in Special Education** (3) Staff

Small group exploration of intrapersonal factors essential to understanding roles and interpersonal techniques in teaching exceptional children. Admission by permission of instructor. (Spring)

FOURTH GROUP

401 **Doctoral Mini-Seminar in Special Education** (1) Staff

Participation in a small group with a selected faculty member; intensive study and discussion of an area of common interest in an informal environment providing for the exchange of ideas and optimum potential for personal and professional growth. Admission by permission of instructor. (Fall)

453–54 **Doctoral Internship: Special Education** (6–6) Staff

Supervised professional internship in college teaching, administration, supervision, or private agency function. Each internship individually arranged. Admission by permission of adviser. (Academic year)

480 **Evaluation Seminar in Special Education/Early Childhood** (3) Shotel

Application of educational evaluation models to special education situations. Special consideration given to the work of Haines, Popham, Scriven, Stake, Stufflebeam, TABA, and Tyler. Practical application of the theoretical models will be stressed. (Fall)

490 **Departmental Seminar in Special Education** (3) Staff

Provides an opportunity for selected graduate students to develop, refine, and demonstrate their skills and abilities in a small-group setting with fellow students and department faculty. Admission by permission of instructor. (Spring)

491 **Dissertation Research** (arr.) Staff

(Fall and spring)

Speech and Drama

Professors E.L. Stevens, J.W. Hillis (*Director of Speech Pathology and Audiology*), L.S. Bowling (*Chairman*), W.M. Reynolds (*Director of Forensics*)

Professorial Lecturers Gilbert Herer, R.D. Crinkley
Associate Professor Lee Bielski
Associate Professorial Lecturer B.P. Cox
Assistant Professors Joan Regnell, Diane Brewer, N.C. Garner (*Acting Director of Theatre*)
Assistant Professorial Lecturers Jacqueline Dudley, Fairlie Arant, Mary Regan
Instructors V.P. Parady, D.L. Skolnick, B.W. Sabelli
Lecturer T.C. Sawyer

Bachelor of Arts with a major in Dramatic Art (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)
2. Prerequisite courses—SPDR 1, 11, 32.
3. Required courses in related areas—24 semester hours of second-group courses outside the Department of Speech and Drama as approved by the major adviser. (Courses in dramatic literature offered in the Classics, English, and foreign language departments are strongly recommended.)
4. Required courses in the major—SPDR 115, 151, 165–66; 12 additional semester hours in second-group drama courses.

Bachelor of Arts with a major in Speech Communication and Broadcasting (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)
2. Prerequisite courses—SPDR 1, 11.
3. Required courses in related areas—12 semester hours in Psychology and/or Philosophy as approved by the major adviser; 18 semester hours in a single subject area outside the Department of Speech and Drama as approved by the major adviser.
4. Required courses in the major—SPDR 112, 121, 126; 15 additional semester hours of second-group courses in the Department of Speech and Drama as approved by the major adviser.

Bachelor of Arts with a major in Speech Pathology and Audiology (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirements for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)
2. Prerequisite courses—SPDR 1, 11.
3. Required courses in related areas—Psyc 115, 121, and 131 (or their equivalent), plus 15 additional semester hours of second-group courses selected from related areas as approved by the major adviser.
4. Required courses in the major—SPDR 101, 103, 104, 106, 118, 119; 6 additional semester hours of courses in the Department of Speech and Drama as approved by the major adviser.

Master of Arts in the field of Speech Pathology and Audiology.—Prerequisite: the degree of Bachelor of Arts with a major in Speech Pathology and Audiology from this University, or an equivalent degree, and the score on the Aptitude Test of the Graduate Record Examination.

Required: the general requirements, pages 93–100. The program of study consists of 36 semester hours of approved course work without a thesis, or with the approval of the Department, 24 semester hours of approved course work plus a thesis (equiva-

at to 6 semester hours). All students must satisfy the academic and supervised racticum requirements of the Certificate of Clinical Competence awarded by the merican Speech and Hearing Association.

All students must take the National Examination in Audiology or in Speech Pathology available through the Educational Testing Service. Students must request the esting Service to send copies of the test scores to the Department of Speech and rama to be used in the fulfillment of the general requirement in the Graduate hool of Arts and Sciences for the Master's Comprehensive Examination. Satisctory test results must reach the Department early enough to be filed with the raduate School Office no later than the day before the faculty meets to approve e list of graduates (approximately two weeks before graduation.

Master of Fine Arts in the field of Dramatic Art.—Prerequisite: the degree of achelor of Arts from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. The program of study consts of (1) 30 semester hours of second- and third-group course work planned in nsultation with the adviser; (2) a creative thesis (equivalent to six additional mester hours) in his or her area of concentration; and (3) a written comprehensive amination. Each candidate is expected to complete the program in residence in ur continuous academic-year semesters.

Bachelor of Arts in Education with a teaching field in Speech and Drama.—Prequisite: the Education curriculum, page 79.

Required: the Speech and Drama option and the professional courses listed on ges 119–21.

Speech and Hearing Therapy: See Speech and Hearing Clinic, page 53.

RST GROUP

1 **Communicative Speaking and Listening** (3) Reynolds and Staff

Basic theories and principles of speech communication; composition, delivery, and criticism of speaking in interpersonal, group, and public situations. Recording fee, $4. (Fall and spring)

11 **Voice and Diction** (3) Bielski and Staff

Development of naturalness, correctness, and clarity in conversational speech. Analysis and correction of individual speech delivery faults through tapes and weekly performances. Recording fee, $4. (Fall and spring)

32 **Oral Interpretation of Literature** (3) Staff

Theory and practice in discovering and communicating orally the meaning in literature through analysis of form and content. Techniques of reading prose, poetry, and drama for listeners. Prerequisite: SPDR 11. Recording fee, $2. (Fall and spring)

45 **Understanding the Theatre** (3) Parady

The art of the theatre; its literature, aesthetics, and mechanics. Contributions of the playwright, actor, director, and designer examined through lectures, visiting artists, class discussion, and attendance at theatrical performances. Primarily for nonmajors. (Spring)

49 **Rhetoric in Political and Social Action** (3) Reynolds

Study of the use and abuse of rhetoric in contemporary political and

social movements. Influence of speech communication on opinion-mak
examined by means of readings, guest speakers, and field projects.
(Fall)

SECOND GROUP

101 **Bioacoustics** (3)

Acoustic analysis of speech and the physiology of reception and proce
of speech by the human auditory system. Prerequisite: BiSc 3–4, 11–
or equivalent; Psyc 1 or 5 or 6, or equivalent. (Fall)

103 **Biophonetics** (3)

Biological bases of speech production. Emphasis on the contributio
the nervous system, the respiratory system, and the vocal and articula
mechanisms in the production of intelligible speech. Prerequisite:
3–4, 11–12, or equivalent; Psyc 1 or 5 or 6, or equivalent. (Fall)

104 **Introduction to Speech Pathology** (3)

Survey of the field of speech pathology. The effect of body-system p
ologies and environmental factors on the production of speech and
guage. Prerequisite: BiSc 3–4, 11–12, or equivalent; Psyc 1 or 5 o
or equivalent. (Spring)

106 **Introduction to Audiology** (3)

Survey of the field of audiology. The effect of body-system pathologie
the reception of speech and other acoustic stimuli. Procedures of
tone and speech audiometry. Clinical and educational services fo
hearing impaired. Prerequisite: SPDR 101. (Spring and summer)

111 **Business and Professional Speaking** (3)

Study of the communication process in business and professional sp
ing; practice in presenting technical reports; selling policies, progr
and services; interviews; conferences; speech in training and supervi
activities. Primarily for nonmajors. (Fall)

112 **Advanced Public Speaking** (3)

In-depth study of and practice in the principles and techniques of
suasive speaking, with emphasis on the psychological factors in aud
analysis and adaptation. Prerequisite: SPDR 1 or permission of ins
tor. (Spring)

115–16 **Acting** (3–3)

Fundamentals of character analysis and development; stage speech
movement, and audition techniques. (Academic year)

118 **Structural Analysis of Speech and Language** (3)

Development of skills in the phonetic/phonemic transcription and
tactic analysis of oral language samples. Prerequisite: Psyc 115 or eq
lent. (Spring)

119 **Clinical Procedures for Communication Disorders** (3)

Development of skill in precision treatment techniques for communi
disorders. Emphasis on accountability of providers of clinical and

cational services for the communicatively handicapped. Prerequisite: Psyc 121 and 131, or equivalent; senior standing or permission of instructor. (Fall)

121 **Group Discussion and Conference Leadership** (3) Stevens

Process of thinking and problem-solving in committees and small groups; methods of leading discussions and conferences. Prerequisite: SPDR 1 or permission of instructor. (Fall and spring)

126 **Argumentation and Debate** (3) Reynolds

Study of the advocacy system; special emphasis on issue identification, use of evidence, and logical proof. Extensive practice in argumentative speaking. Prerequisite: SPDR 1 or permission of instructor. (Spring)

127–28 **Advanced Debate Practice** (1–1) Staff

Admission by permission of instructor, after one semester of satisfactory participation in intercollegiate debate program. May be repeated for a total of 4 semester hours of credit. (Fall and spring)

133 **Broadcasting in America** (3) Skolnick

Study of the origins, structure, and nature of American broadcasting with emphasis on communicative factors and effects of television programming. (Fall)

134 **Radio Production and Performance** (3) Skolnick

Introduction to the basic concepts of radio as a communication medium; emphasis on the design and production of a variety of radio programs. Prerequisite: SPDR 133 or permission of instructor. Recording fee, $5. (Spring)

135–36 **Radio Workshop** (1–1) Skolnick

Practical work in campus radio station. Admission by permission of instructor, after one semester of satisfactory participation in WRGW activities. May be repeated for a total of 4 semester hours of credit. (Academic year)

143 **Origins of Contemporary Rhetorical Theory** (3) Reynolds

Study of rhetorical theory and method as they evolved in the Western world from the classical period to the present. (Fall 1976 and alternate falls)

144 **History and Criticism of American Public Address** (3) Reynolds

Study of American oratory from its pre-Revolution origins to the present day, interpreted in terms of issue sand movements. (Spring 1975 and alternate springs)

145 **Television Production and Performance** (3) Skolnick

Basic course in television production techniques and skills. Programming, directing, script-writing, and other aspects of television production. Extensive practice in working television equipment; emphasis on various in-studio projects. Recording fee, $5. (Fall 1975 and alternate falls)

146 **Advanced Television Production and Performance** (3) Skolnick

Advanced study and practice of television production techniques. Students

are expected to demonstrate skill in working with studio equipment an in the development of television programs from original concepts to fin productions. Recording fee, $5. Prerequisite: SPDR 145 and permis sion of instructor. (Spring 1976 and alternate springs)

151–52 **Stagecraft** (3–3)

Lecture (2 hours), laboratory (1 hour). Theories and practicum in scen struction, rigging, lighting, and scene painting. (Academic year)

154 **Directing** (3)

(Formerly Play Directing)

Fundamentals of script analysis, casting and rehearsal techniques. Pre requisite: SPDR 116 and 151. Laboratory fee, $5. (Fall)

155–56 **Play Production Practice** (1–1)

Practical work in theatre. Assigned production duties in one of the fo lowing areas: scenery, costuming, lighting/sound, properties, public re lations, acting. May be repeated for a total of four semester hours c credit, but a different area must be elected at each registration. (Aca demic year)

161–62 **Theatrical Styles** (3–3)

Detailed study of the culture, climate, and production techniques of s nificant periods of drama. (Academic year)

165–66 **History of the Theatre** (3–3)

An examination of the development and growth of the theatre from beginnings to the present. SPDR 165: Greek through Restoration. SPDR 166: the 18th century to the present. (Academic year)

169 **Introduction to Creative Dramatics** (3)

Study of philosophies and practices underlying dramatics with children materials and methods for conducting improvised dramatic activities elementary and secondary education. (Spring)

*192 **The American Cinema** (3)

History and criticism of American films. At least one film will be sho each week, on which there will be readings, discussions, and lectures The course will enable the student to develop an ability to see and evalua cinema techniques, to express the evaluation clearly in writing, and t understand the role of films in the context of American culture. The American Film Institute's Rediscovery Series will be used as a laboratory Subscription to the Series is $15, payable to the American Film Institu

193 **Scene Design** (3)

(Formerly Design)

Fundamental study of design theory and practice, including drafting, pa dering, and model construction. (Fall)

195 **Costuming** (3)

Study of costume history, materials, and construction. (Fall)

* Joint offering of the Department of Speech and Drama and the American Studies Program. Stu may register under either designation.

196 **Independent Study** (1 to 6) — Staff

Independent research and special projects. Open only to undergraduate students in their senior year. Before a student is permitted to register for SPDR 196, he must submit a written proposal of his plan of study and obtain approval of the staff member who will be directing the study as well as of the Departmental Chairman.

THIRD GROUP

SPDR courses numbered from 268 through 290 and SPDR 295 are for Master of Arts candidates in the field of Speech Pathology and Audiology; other students may be admitted by permission of the Department.

215–16 **Advanced Acting** (3–3) — Garner

Scene work in classic and other nonrealistic drama. Admission by audition. Both courses may be repeated once for credit. (Academic year)

251 **Advanced Scene Design** (3) — Sabelli

(Formerly Advanced Design)

Project work in all styles of traditional and modern scene design. (Spring 1977 and alternate springs)

252 **Advanced Costuming** (3) — Parady

Study of special design, style, and construction problems. Admission by permission of instructor. (Spring 1976 and alternate springs)

255 **Lighting Design** (3) — Sabelli

(Formerly Lighting)

Theory and practice of stage lighting. (Spring 1976 and alternate springs)

256 **Advanced Directing** (3) — Garner

Methods of rehearsal for selected directorial problems. (Spring)

257 **Modern Trends** (3) — Staff

Study of recent developments in dramatic theory, literature, and production. (Fall 1976 and alternate falls)

258 **Theatre Management** (3) — Parady

Theory and practice in the psychology of handling the public: promotion, box office and house management. Admission by interview. (Fall 1975 and alternate falls)

268 **Clinical Practice in Communication Disorders** (1–3) — Staff

Supervised clinical practice in the evaluation and treatment of communication disorders. May be repeated for a total of 3 semester hours of credit. (Fall and spring)

269 **Community Programs in Communication Disorder** (3) — Herer

Methods and procedure for the planning, management, and operation of hospital, school, and other community programs for the communicatively handicapped. (Fall)

271 **Evaluation of Speech Articulation Disorders** (2) Regn
(Formerly Articulation Disorders I)
Evaluation of persons with speech articulation disorders: staffing of clinic cases, test demonstrations, critical evaluations of speech articulation tes ing procedures. Laboratory fee, $5. (Fall)

272 **Etiology of Speech Articulation Disorders** (2) Hill
(Formerly Articulation Disorders II)
Biological, linguistic, and psychological bases for disorders of speec articulation; staffing of clinical cases. Laboratory fee, $5. (Sprin

273 **Treatment of Speech Articulation Disorders** (2) Regn
(Formerly Articulation Disorders III)
Treatment procedures of persons with disorders of speech articulatio emphasis on programmed and other objective procedures for the improv ment of speech articulation; staffing of clinical cases. Laboratory fe $5.

274 **Treatment of Fluency Disorders in Adults** (2) Hill
(Formerly Fluency Disorders I)
Evaluation and treatment of fluency disorders in adults; staffing of clinic cases; demonstration and critical evaluation of testing and treatment pr cedures. Laboratory fee, $5. (Fall)

275 **The Nature of Fluency Disorders** (2) Hill
(Formerly Fluency Disorders II)
Theoretical bases for the treatment of fluency disorders; staffing of clinic cases. Laboratory fee, $5. (Spring)

276 **Treatment of Fluency Disorders in Children** (2) Hill
(Formerly Fluency Disorders III)
Evaluation and treatment of fluency disorders in children; staffing of cli cal cases; demonstration and critical evaluation of testing and treatme procedures. Laboratory fee, $5.

277 **Clinical Evaluation of Language Disorders** (3) Sta
(Formerly Language Disorders I [2])
Evaluation of language disorders in children and adults; class staffings language pathology cases, test demonstrations, and critical evaluations formal and informal language testing procedures. Laboratory fee, $ (Fall)

278 **Applied Research in Language Disorders** (3) Sta
(Formerly Language Disorders II [2])
Current neurolinguistic and psycholinguistic research related to langua pathologies in children and adults; emphasis on the treatment of apha in adults including demonstrations of objective procedures for chart clinical progress. Laboratory fee, $7.50. (Spring) Sta

279 **Clinical Treatment of Language Disorders in Children** (3)
(Formerly Language Disorders III [2])
Current language therapy programs for children and critical evaluation these programs in light of modern psycholinguistic concepts; emphasis

objective procedures for attaining or modifying desired goals in language therapy for children with various handicapping conditions. Laboratory fee, $7.50. (Summer)

280 **Functional Voice Disorders** (2) Regnell
(Formerly Voice Disorders I)
Review of the normal structure and function of the vocal mechanism, acquisition of knowledge and of clinical/educational skills in providing speech evaluation and treatment for persons with functional voice disorders. Laboratory fee, $5. (Fall)

281 **Alaryngeal Speech** (2) Regnell
(Formerly Voice Disorders II)
Acquisition of knowledge and of clinical/educational skills in providing speech evaluation and treatment for laryngectomized persons. Laboratory fee, $5. (Spring)

282 **Organic Voice Disorders** (2) Regnell
(Formerly Voice Disorders III)
Acquisition of knowledge and of clinical/educational skills in providing speech evaluation and treatment for persons with organic voice disorders; special consideration given to the management of voice disorders in children. Laboratory fee, $5. (Spring)

283 **Aural Rehabilitation** (3) Brewer
Systems, principles, and methods of auditory training and speech reading, including development of lesson plans and their application in resolving communication problems of acoustically-handicapped individuals. Laboratory fee, $7.50. (Fall)

284 **Advanced Clinical Audiology** (3) Bowling
Principles and methods underlying assessment of auditory disorder; emphasis on bone conduction, masking, and speech intelligibility. Clinical implications, tests; demonstration and practicum. Laboratory fee, $7.50. (Fall)

285 **Hearing Aids** (3) Brewer
Discussion of hearing-aid characteristics and electroacoustic measurements; hearing-aid effectiveness in improving communicative efficiency; procedures for selection and clinical evaluation of hearing aids; counseling of the patient. (Spring)

286 **Special Auditory Tests** (3) Bowling
Special speech and pure tone audiometric techniques for differentiating conductive, cochlear, and retro-cochlear lesions, for identifying functional hearing losses. Clinical application of tests and interpretation of results. Laboratory fee, $7.50. (Fall)

287 **Auditory Perception and Comprehension** (3) Bowling
Detailed study of the factors which affect auditory perception and comprehension; methods and procedures used in identifying disorders of auditory perception and comprehension. Laboratory fee, $7.50. (Spring)

288 **Psychosocial Aspects of Hearing Loss** (3)

Consideration of the rationale and procedures for evaluating the social emotional behavior as well as the intellectual potential of those impaired hearing. Laboratory fee, $7.50. (Spring)

289 **Pediatric Audiology** (3)

Development of skills in audiological assessment of young children other difficult-to-test groups. Laboratory fee, $7.50. (Spring)

290 **Management of the Hearing-impaired Child** (3)

Overall management approach to the hard-of-hearing child includ diagnosis, parent counseling, amplification, educational placement, tre ment programs and procedures, and re-evaluation. Emphasis on au habilitation within an educational framework. Laboratory fee, $ (Summer)

294 **Independent Research in Dramatic Art** (arr.)

May be repeated for credit. (Fall and spring)

295 **Independent Research in Speech and Hearing** (arr.)

299–300 **Thesis Research** (3–3)

(Fall and spring)

Statistics

Professors H.F. Bright, H.W. Lilliefors, A.D. Kirsch, R.H. Shumway, Cornfield (*Chairman*), J.L. Gastwirth, Lawrence Shaw (*Research*), Mantel (*Research*), Dean Krueger (*Research*), Samuel Greenhouse
Professorial Lecturers F.C. Leone, Harry Weingarten, W.W. Wolman
Associate Professors C.T. Ireland, R.E. Thomas
Associate Professorial Lecturers M.A. Schwartz, Fred Frishman
Assistant Professors J.P. Dirkse III, J.M. Lachin III (*Research*)
Adjunct Assistant Professor J.K. Kern
Assistant Professorial Lecturers William Rutiser, T.C. Teeples

Bachelor of Arts or *Bachelor of Science with a major in Applied Statistics* (*partmental*) *or Mathematical Statistics* (*Departmental*), *or Computer Science* (*partmental*).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 76–77, 83–89. (Students sho consult the departmental adviser regarding courses to be taken in satisfying requirements for "meaningful initiation" into the Humanities and Social Studie
2. Prerequisite courses for all three majors—Math 31, 32; Stat 91.
3. (a) Required course in related areas for the Applied Statistics major—M 124. (Courses in computer science and some field of application are recommend Foreign language is not required for this major.)

(b) Required courses in related areas for the Mathematical Statistics major Math 124, 139, 140, 157; two years of introductory French, German, or Russ or equivalent. (Courses in computer science, mathematics, and some field of app cation are recommended.)

(c) Required courses in related areas for the Computer Science major Math 113, 124, 153. (Foreign language is not required for this major.)

4. (a) Required courses in the Applied Statistics major—Stat 97, 113, 117, 118, 157–58, 189; plus three approved second-group courses in Statistics.

(b) Required courses in the Mathematical Statistics major—Stat 97, 117, 118, 157–58, 189–90; plus three approved second-group courses in Statistics.

(c) Required courses in the Computer Science major—Stat 98, 113, 114 (in that order), 117, 157–58, 183; plus three approved electives in Mathematics and Statistics (Math 101, 270 and Stat 197, 198 are recommended).

To assure a balanced program, departmental approval of elective is required for both majors.

Master of Science in the field of Applied Statistics or *Master of Arts in the field of Mathematical Statistics.*—The program of study consists of 30 semester hours of course work without a thesis. In exceptional cases the Department may approve a program of study consisting of 24 semester hours of course work plus a thesis, equivalent to 6 additional semester hours. Candidates must pass a written Master's Comprehensive Examination and must fulfill the tool requirement by passing either a reading knowledge examination in an acceptable foreign language or an examination in computer language. The successful completion of course work in computer programming does not obviate the requirement to pass a special examination should the computer option be elected as a tool. For prerequisites and additional requirements, see below.

Master of Science in the field of Applied Statistics.—Prerequisite: a Bachelor's degree with a major in Applied Statistics from this University, or an equivalent degree. If undergraduate study did not include equivalent required courses at this University, those courses must be taken as prerequisite to graduate study.

Required: the general requirements, pages 93–100, including 18 semester hours of Statistics and 12 additional hours of approved course work in an area of interest to the candidate. Courses are selected in consultation with the adviser.

Master of Arts in the field of Mathematical Statistics.—Prerequisite: a Bachelor's degree with a major in Mathematical Statistics from this University, or an equivalent degree. If undergraduate study did not include equivalent courses at this University, those courses must be taken as prerequisite to graduate study.

Required: the general requirements, pages 93–100, including Stat 201–2 or 257–58; and 217–18. The remaining 18 semester hours must be selected in consultation with the adviser.

Doctor of Philosophy in the field of Mathematical Statistics.—Prerequisite: the degree of Master of Arts in the field of Mathematical Statistics from this University, or an equivalent degree.

Required: the general requirements, pages 93–97, 100–102. A minimum of 24 semester hours of course work must be taken in residence at this University before the General Examination may be completed. The General Examination consists of and oral examination following four days of written examinations: Part I—Matrix Algebra, Real and Complex Analysis, Probability; Part II—Mathematical Statistics. The first of the General Examination may be taken after successful completion of Stat 259–60 or its equivalent; the second part may be taken after completion of Stat 257–58, 263–64, 265–66. The tool requirement may be fulfilled by passing a reading knowledge examination in one foreign language and an examination in computer language. The successful completion of course work in computer programming does not obviate the requirement to pass a special examination should the computer option be elected as a tool.

Research Fields: Bayesian Inference, Biostatistics, Design of Experiments, Information Theory, Multivariate Analysis, Nonparametric Statistics, Robust Methods, Sampling, Statistical Inference, Stochastic Processes, and Timed Series Analysis.

Departmental prerequisite: One entrance unit in algebra is prerequisite to all first-group courses in Statistics.

FIRST GROUP

*51 **Introduction to Business and Economic Statistics** (3) — Bright, Kern, Schwartz

Lecture (3 hours), laboratory (1 hour). Frequency distribution, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $18. (Fall and spring)

*53 **Introduction to Statistics in Social Science** (3) — Dirkse, Frishman, Kern, Kirsch

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, analysis of variance. Laboratory fee, $18. (Fall and spring)

*91 **Principles of Statistical Methods** (3) — Lilliefors

Lecture (3 hours), laboratory (1 hour). Variables and attributes, averages and dispersion, frequency distributions and their characteristics, regression and correlation, statistical decision processes. Laboratory fee, $18. (Fall and spring)

97 **Introduction to Computer Programming** (3) — Teeples

Lecture (2 hours), laboratory (2 hours). Computer and programming concepts. High-level language programs written by students will be run on the University computer. Laboratory fee, $25. (Fall and spring)

98 **Introduction to Computing** (3) — Thomas

Development of basic computing ideas using a high-level language. Emphasis on careful design and implementation of programs using "structured programming."

SECOND GROUP

105 **Statistics in the Behavioral Sciences and Education** (3) — Kirsch

Lecture (3 hours), laboratory (1 hour). Advanced study of statistical techniques for research problems. Analysis of variance, correlation techniques, nonparametric techniques, sampling theory. Prerequisite: Stat 5[illegible] or former 104. Laboratory fee, $18. (Fall and spring)

107 **Statistics for Engineers** (3) — Staff

Probability models, discrete and continuous distributions, sampling, hypothesis testing and estimation, engineering applications. Prerequisite: differential and integral calculus. (Not offered academic year 1975-76)

109–10 **Quality Control and Reliability Techniques** (3–3) — Staff

Statistical methods and probability models for quality control and reliability applications. Prerequisite: Stat 91 or 107. (Not offered academic year 1975-76)

* Stat 51, 53, and 91 are related in their subject matter, and credit hours for only one of the three may be applied toward a degree.

111 **Business and Economic Statistics I** (3) — Greenhouse, Weingarten, Wolman

Statistical processes as tools in decision-making in areas of economics and business. Admission by permission of instructor. (Fall)

112 **Business and Economic Statistics II** (3) — Staff

Case work to illustrate quantitative procedures for solution of economic and business problems. Prerequisite: Stat 111 or equivalent. (Spring)

113 **Computer Programming** (3) — Thomas and Staff

Lecture (2 hours), laboratory (2 hours). Computer concepts beyond the introductory level; an introduction to assembly language and advanced high-level language programming. Prerequisite: Stat 97. Laboratory fee, $25. (Spring)

117 **Analysis of Variance** (3) — Staff

Lecture (3 hours), laboratory (1 hour). Introduction to the design of experiments and analysis of variance; random block, factorial, Latin square, and analysis of covariance. Prerequisite: Stat 118. Laboratory fee, $18. (Spring)

118 **Regression Analysis** (3) — Kirsch and Staff

Lecture (3 hours), laboratory (1 hour). Regression and correlation theory; simple, partial, and multiple. Prerequisite: 3 semester hours selected from Stat 51, 53, 91, 107. Laboratory fee, $18. (Fall and spring)

119 **Bases of Statistical Decision-making** (arr.) — Kern

For students in the Navy Graduate Financial Management Program only. Introduction to techniques of decision-making; emphasis on applications rather than theory.

122 **Forecasting Principles and Techniques** (3) — Staff

Survey and appraisal of current economic forecasting techniques and indicators of business conditions. Preparation of an actual forecast. Prerequisite: Stat 51 or equivalent. (Not offered academic year 1975-76)

*123 **Introduction to Econometrics** (3) — Bennett

Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques applicable to economic models. Prerequisite: Econ 101, 102; Math 31 or 51; Stat 111. (Spring)

131 **Contingency Table Techniques** (3) — Staff

Analysis of multidimensional contingency tables, including estimation, tests of hypotheses, and log-linear regression. Prerequisite: Stat 118 or permission of instructor. Laboratory fee, $18. (Spring)

153–54 **Mathematical Models in Population Genetics** (3–3) — Staff

(Formerly Stat 253–54)

Basic elements of genetics and cell reproduction, deterministic models of gene frequency; the Hardy-Weinberg law; effects of mutation, migration, and selection on gene frequency; multiple loci and multiple allele models;

* An interdepartmental course offered by the departments of Statistics and Economics.

inbreeding; Fisher's fundamental theorem of natural selection; stochastic models of changes in gene frequency, including methods of direct product branching processes and diffusion equation methods. (Academic year)

155 **Introduction to Probability** (3) Shumway

Probability distribution, Bayes' theorem and postulate, mathematical expectation, laws of large numbers. Prerequisite: one entrance unit in algebra. (Not offered academic year 1975-76)

157–58 **Introduction to Mathematical Statistics** (3–3) Shumway

Distribution theory, sampling theory, estimation, hypothesis testing, regression analysis, experimental design. Prerequisite: differential and integral calculus. (Academic year)

159 **Principles of Bayesian Statistics** (3) Staff

Lecture (3 hours), laboratory (1 hour). Probability as a measure of uncertainty of knowledge; concepts and techniques of Bayesian inference. Prerequisite: 3 semester hours in introductory statistics, or equivalent. Laboratory fee, $13. (Not offered academic year 1975-76)

161–62 **Information Theory** (3–3) Staff

Elementary development of information theory and applications to communication, coding, psychology, linguistics, etc. Prerequisite: 3 semester hours selected from Stat 107, 155, 157, 159, 189. Laboratory fee, $18. (Not offered academic year 1975-76)

165–66 **Multivariate Techniques** (3–3) Shumway

Application of multivariate statistical techniques to multidimensional research data from the behavioral, social, biological, medical, and physical sciences. Prerequisite: Stat 117, 157–58. Laboratory fee, $18. (Academic year)

181 **Applied Time Series Analysis** (3) Shumway

Application of time series analysis to data from economics, medicine, and the physical sciences. Fourier methods in regression and analysis of variance, autoregressive and moving average models, signal discrimination and detection. Prerequisite: Stat 117, 118. Laboratory fee, $30. (Fall)

183 **Intermediate Statistical Laboratory** (3) Staff

Applications to advanced experimental design and other topics. Admission by permission of instructor. Laboratory fee, $25. (Fall or spring)

187 **Theory of Sampling** (3) Schwartz

Problems of sampling and sample design. Prerequisite: Stat 91 or equivalent. (Fall)

188 **Nonparametric Statistical Inference** (3) Lilliefors

Statistical inference when the form of underlying distribution is unspecified. Prerequisite: Stat 91 or equivalent. (Spring)

189–90 **Mathematical Probability and Applications** (3–3) Dirkse

Combinatorial analysis, conditional probability, stochastic independence, probability distributions, random variables, laws of large numbers. Prerequisite: differential and integral calculus. (Academic year)

191 **Probabilistic Methods for Operations Research** (3) Leone

Primarily for students in the School of Engineering and Applied Science. Axiomatic theory, random variables, Bayes' theorem, some special distributions, generating functions, convergence, Poisson and Markov processes. Prerequisite: ApSc 115 or equivalent. (Fall)

192 **Statistical Methods for Operations Research** (3) Staff

Primarily for students in the School of Engineering and Applied Science. Sampling, estimation, sampling distributions, hypothesis testing, the general linear hypothesis, experimental design models, elements of sequential analysis and nonparametric statistics. Prerequisite: Stat 191 or equivalent. (Spring)

195 **Reading and Research in Statistics** (arr.) Staff

May be repeated once for credit. (Fall and spring)

197 **Digital Computer Programming with Applications** (3) Thomas

Lecture (2 hours), laboratory (2 hours). Use of digital computer in statistical and other computational work. Writing, debugging, and running programs on the digital computer in the University Computer Center. Prerequisite: Stat 117; or Math 32; or permission of instructor. Laboratory fee, $25. (Spring)

198 **Current Topics in Computer Programming** (3) Rutiser

Concepts of programming, programming languages, operating systems, nonnumeric programming compiler techniques. Prerequisite: Stat 113 or permission of instructor. Laboratory fee, $25. May be repeated for credit. (Fall)

THIRD GROUP

201–2 **Mathematical Statistics** (3–3) Dirkse

Distribution theory, sampling theory, estimation, sufficient statistics, hypothesis testing, analysis of variance, multivariate normal distribution. Prerequisite: advanced calculus. (Academic year)

205 **Data Analysis for Educational Policy Decisions** (3) Kirsch

The framing of questions of importance in educational policy and the use of existing data bases to answer these questions. Laboratory fee, $20. Prerequisite: Stat 105 or equivalent. (Not offered academic year 1975-76)

206 **Factor Analysis** (3) Kirsch

Concepts of factor analysis and their utility in various phases of research and related topics, including cluster analysis. Prerequisite: Stat 105 or equivalent and permission of instructor. Laboratory fee, $18.

207–8 **Operations Analysis** (3–3) Staff

Basic concepts and techniques. Introduction to simulation, linear programming, game theory, queuing theory, inventory theory, and other topics. Admission by permission of instructor. (Not offered academic year 1975-76)

217–18 **Advanced ANOVA and Experimental Design** (3–3) Lilliefors

Advanced theory and application of general linear hypothesis to experimental designs. Prerequisite: Stat 157–58 or 201–2. (Academic year)

221 **Design of Experiments for Behavioral Sciences and Education** (3) Kirsch

Applications of advanced experimental design to research problems in behavioral sciences and education. Prerequisite: Stat 105 or 117 and permission of instructor. Not open to graduate students in Statistics. (Spring)

223–24 **Bayesian Inference** (3–3) Cornfield

Systematic development of Bayesian viewpoint, with applications to the classical problems of statistics. Prerequisite: Stat 201–2.

225–26 **Introduction to Biostatistics** (3–3) Staff

Probability models, inference, and study design as applied to biomedical investigations. Prerequisite: Math 31 or permission of instructor. (Not offered academic year 1975-76)

231 **Contingency Table Analysis** (3) Staff

A study of the theoretical bases underlying the analysis of categorial data. Prerequisite: Stat 201–2 or 257–58. (Not offered academic year 1975-76)

242 **Advanced Statistical Problems in Economic Analysis** (3) Gatswirth

Applications of advanced theory to research and decision problems involving economic data.

257–58 **Distribution Theory** (3–3) Gastwirth

Random variables, distribution functions, moments, sequences of random variables, characteristic functions, special distributions, sampling theory, asymptotic distributions. Prerequisite: Stat 157–58 or 201–2. (Academic year)

259–60 **Advanced Mathematical Probability** (3–3) Staff

Measure theory, probability spaces, random variables, probability distributions, sequences of random variables, conditioning, martingales. Prerequisite: Math 224 or equivalent. (Not offered academic year 1975-76)

263–64 **Topics in Statistical Inference** (3–3) Lilliefors

Estimation, testing of statistical hypotheses, tests of significance, likelihood ratio, Bayesian inference and the use of prior knowledge, decision and information theory. Prerequisite: Stat 201–2 or 257–58. (Academic year)

265–66 **Multivariate Analysis** (3–3) Greenhouse

Tests of significance, homogeneity, independence, canonical and vector correlations, multivariate normal distribution, generalized Student's ratio, multivariate linear hypothesis, and analysis of variance. Prerequisite: Stat 201–2 or 257–58. (Academic year)

267–68 **Characteristic Functions** (3–3) Staff

Fourier integrals, distribution functions, inversion formulas, limit theorems, applications to the distribution problem of statistics. Prerequisite: Stat 189–90; 201–2 or 257–58. (Not offered academic year 1975-76)

269–70 **Statistical Decision Theory** (3–3) Staff

Wald's theory of decision functions. Sequential analysis. Multi-decision problems. Existence theorems, complete class theorems, and other general decision theoretic results. Prerequisite: Stat 189–90; and 201–2 or 257–58. (Not offered academic year 1975-76)

273–74 **Markov Processes** (3–3) Cornfield

Fundamental notions of Markov chains and processes, generating functions, recurrence, limit theorems, random walks, Poisson processes, birth and death processes, applications. Prerequisite: Stat 189–90; and 201–2 or 257–58.

*275 **Econometrics I: Introduction** (3) Bennett

Single equation models of economic behavior. Statistical methods for testing economic hypotheses and estimating parameters. Introduction to simultaneous equations problems. Prerequisite: Stat 157–58 or equivalent, or permission of instructor. (Fall)

*276 **Econometrics II: Simultaneous Equations Models** (3) Bennett

Economic models and simultaneous equations systems. Prerequisite: Stat 275. Recommended: a course in matrix theory. (Spring)

*279 **Methods in Economic Statistics** (3) Gastwirth

Applications of statistical methods to economics. Curve-fitting, regression, analysis of variance and chi-square techniques used to analyze economic data. Prerequisite: a year course in Statistics.

281 **Time Series Analysis** (3) Shumway

Stationary and nonstationary time series, auto- and cross-correlation, power spectral analysis, multivariate normal processes, mean square estimation and regression, statistical inference, applications. Prerequisite: Stat 189–90 and 201–2 or 257–58. (Not offered academic year 1975–76)

283 **Advanced Statistical Laboratory** (3) Staff

Application of the University computer to complex statistical problems on an individual study basis. Admission by permission of instructor. Laboratory fee, $25. May be repeated for credit only with permission of the Department. (Fall and spring)

285–86 **Seminar** (3–3) Staff

Admission by permission of instructor. (Stat 285 and 286—fall and spring)

287–88 **Modern Theory of Sample Surveys** (3–3) Staff

Application of statistical theory to the sampling of finite populations. Simple, stratified, cluster, double and subsampling. Special topics, includ-

* An interdepartmental course offered by departments of Statistics and Economics.

ing super-populations and randomized response. Prerequisite: Stat 91 and Math 32 or equivalents.

289 **Seminar: Current Topics in Biostatistics** (3) Staff
Discussion of selected current literature in clinical trials, epidemiology, automated diagnosis, and other topics of biomedical interest. Admission by permission of instructor.

295 **Reading and Research** (3) Staff
May be repeated once for credit. (Fall or spring)

296 **Seminar: Data Analysis Methods** (3) Staff
Case studies, data analysis procedures, and problems that a consultant might encounter.

297 **Problems in Mathematical Statistics** (3) Staff

298 **Seminar: Combinatorial Probability** (3) Staff

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

*378 **Seminar: Topics in Econometrics** (3) Staff
Limited to graduate students, primarily for doctoral students; offered as demand requires. A research seminar covering current econometric literature and special topics. Admission by permission of instructor.

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Urban and Regional Planning

Professors D.C. McGrath, Jr. (*Chairman*), Fernando Belaunde-Terry (*Visiting*)
Professorial Lecturers Norman Beckman, Norman Klein
Associate Professors Sherwin Greene, S.S. Fuller
Associate Professorial Lecturers S.J. Bellomo, S.D. MacDonald

A program leading to the degree of *Master of Urban and Regional Planning*, which provides preparation for professional practice in the planning field, and areas of specialization in planning as components of programs leading to the degrees of *Master of Arts in Government, Master of Public Administration, Doctor of Business*

* An interdepartmental course offered by departments of Statistics and Economics.

Administration, and *Doctor of Public Administration*, are offered by the School of Government and Business Administration (see pages 133–63).

SECOND GROUP

153 **Principles of Urban Planning and Design** (3) Staff

Studio course for undergraduates. Basic elements of urban planning and design applied to community problems. Survey of planner's role in developing and implementing creative solutions to urban problems. (Spring)

THIRD GROUP

201 **Introduction to Urban Planning** (3) McGrath

Introduction to history, concepts, and activities of urban planning. Discussion of trends in urbanism and the influences of technology and social change. (Fall and spring)

202 **Urban Planning Theory** (3) Staff

Development of the fundamental theories and concepts of urban growth and change, urban social structure and change, theories of the planning process, and the role of politics in the planning process. Prerequisite: U&RP 201 or permission of instructor. (Spring)

203 **Fundamentals of Urban Design** (4) Greene

Planning and design studio to develop and apply planning methods and graphic techniques, principles of land use and urban design; analysis of factors affecting community development and change. Open only to candidates for the degree of Master of Urban and Regional Planning. (Fall)

204 **Urban Development Planning** (4) Greene

Planning and design studio: investigation of social, environmental, and technological factors in planning. Application of comprehensive planing process to typical problems of community growth and development. Prerequisite: U&RP 203 or permission of instructor. Laboratory fee, $10. (Spring)

205 **Urban Housing** (3) Fuller

Examination of the housing problem: housing market characteristics, analytical techniques, national needs, costs, financing federal programs, technology, rehabilitation, and policy formulation. Prerequisite: U&RP 201. (Fall)

206 **Community Facilities Planning** (3) Fuller

Planning implications of essential public facilities which comprise community infrastructure. Emphasis on developing an understanding of the special design, service, and locational requirements of each class of community facility, the relationships among facilities, and their effects on urban development and the community at large. Prerequisite: U&RP 201 or permission of instructor. (Spring)

207 **Land Development Planning** (3) McGra

Selected problems in urban and regional planning: applications of zo ing, urban renewal, and special programs available for the implemen tation of development plans. Prerequisite: U&RP 201 or permission instructor. (Fall)

208 **Urban Transportation Planning** (3) Kle

Relationships between land use and the movement of goods and peop in urban areas. Transportation planning principles, policy problem methods for analyzing demand and systems for urban travel; roles public agencies and private interests in the planning and development various modes. Prerequisite: Mgt 204, U&RP 201. (Fall)

209 **Urban Transportation Models** (3) Bellom

Consideration of land use activity, trip generation and distribution, e vironmental impact, and modal choice models, traffic assignment, an decision-making techniques. Review of detail studies, calibration, inte actions, applications, and accuracy limitations of various mathematic models. Prerequisite: U&RP 208 or permission of instructor. (Spring

210 **Urban Development Economics** (3) MacDonal

Economic forces affecting urban growth and change; relationships amo cities, metropolitan areas, and regions in the context of the nation economy; socioeconomic implications of urban land development policie basic studies and methods of economic analysis. Prerequisite: Econ 21 18 or equivalent; U&RP 201. (Spring)

213 **Social Factors in Urban Planning** (3) Sta

Consideration of the impact of social groups, social class, and soci institutions on urban structure; development of techniques for reflecti social variables in the planning process. Prerequisite: U&RP 201 or pe mission of instructor. (Fall)

215 **Advanced Planning Problems** (4) McGrath and Sta

Investigation of complex problems of the metropolitan region, analys of findings, formulation of proposals, and presentation of material faculty and cooperating groups. Multidisciplinary team and individu planning projects. Studio course. Prerequisite: U&RP 204. Laborato fee, $10. (Spring)

218 **Metropolitan and Regional Planning** (3) Fuller and Sta

Multidisciplinary study of the methods of regional analysis and proce of regional planning; development of projects of regional scale require problem analysis, synthesis, and plan formulation. Studio course. Pre requisite: U&RP 204 or permission of instructor. Laboratory fee, $1 (Fall)

232 **Urban Environment and the Planner** (3) Fulle

Exploration of the relationship between man and his urban environment emphasis on the role of the urban planner. Theory, research, planni methods, current issues, and laws examined. Prerequisite: U&RP 201 permission of instructor. (Spring)

240 **Federal and State Urban Policy Development** (3) Beckman

Investigation of contemporary trends in the evolution of federal and state governmental functions and programs affecting urban growth and development policy. Planning functions in the evolving relationships among units of federal, state, and metropolitan agencies. Prerequisite: U&RP 201 or permission of instructor. (Fall)

290 **Special Topics in Urban and Regional Planning** (3) Staff

An experimental course enabling the department to develop new course topics and test new teaching methods. May be repeated once for credit. (Fall or spring)

295 **Research Methods** (3) Staff

(Formerly Urban Research)

Directed research and investigation of special problems in community development. May be repeated once for credit. (Fall and spring)

298 **Directed Readings and Research in Urban and Regional Planning** (3) Staff

(Fall or spring)

299 **Thesis Seminar** (3) Staff

Examination of thesis standards, research philosophy and methodology. (Fall and spring)

300 **Thesis Research** (3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Business Administration or Doctor of Public Administration general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Business Administration or Doctor of Public Administration candidates. May be repeated for credit. (Fall and spring)

Women Studies—Graduate Study

Professorial Lecturer Marguerite Rawalt
Associate Professorial Lecturer Ruth H. Osborn

COMMITTEE ON WOMEN STUDIES

Ruth H. Osborn (*Coordinator*), Thelma Z. Lavine, Lois G. Schwoerer, Suzanne L. Simons, M. Elizabeth Tidball

The Graduate School of Arts and Sciences offers an interdisciplinary program leading to the degree of Master of Arts in Special Studies with a concentration in

Women Studies, directed by the Committee on Women Studies. Each student wi work closely with the Committee in designing a program to meet individual interes goals, and background knowledge. Prospective candidates should consult with th Coordinator of the Committee for specific requirements.

Master of Arts in Special Studies (Women Studies).—Prerequisite: a Bachelor degree from an accredited college or university. Students are expected to have com pleted the prerequisites to graduate courses.

Required: the general requirements, pages 93–100. The program of study consis of 36 semester hours with or without a thesis, including a plurality of approve courses in the Arts and Sciences with no more than one-third from any one depar ment. WStu 220 and 221 are required courses for all students; WStu 283 and 2 are required for students *not electing* a thesis; WStu 299–300 is required for thos *electing* a thesis. All candidates are required to pass a Master's Comprehensiv Examination. There is no tool requirement.

THIRD GROUP

220 Selected Topics on Women (3) Staf

Research and theory from the following: anthropology, economics, his tory, literature, philosophy, physiology, psychology, and sociology. (Fall and spring)

221 Seminar: Women in Perspective (3) Staf

Past, present, and future roles of women based on interdisciplinary studi Prerequisite: WStu 220. (Fall and spring)

231 Women and the Law (3) Rawal

An examination of the status of women in selected areas of the law Emphasis on employment, health and welfare services, education, and public accommodations. (Fall and spring)

235 Counseling and Career Development of Women (3) Osbor

Multidimensional analysis of factors, theories, problems, and practices career development and its relationship to counseling women. (Fa and spring)

240 Women in the Political System (3)

A comprehensive analysis of women and politics at federal, state, an local levels; voting patterns, election management, and the impact of th women's movement on the two-party system. (Fall and spring)

250 Women in English Renaissance Literature (3) Paste

Representative women characters, from Queen Elizabeth to city wive and courtesans, in the poetry, masques, and dramas of Spencer, Shak speare, and their contemporaries. Brief consideration of historical an literary contexts relevant to representation of women in the Renaissance (Fall and spring)

280 Independent Study (3) Staf

283 **Practicum in Women Studies** (3) Staff

Field experience in agencies engaged in counseling, instruction, or supervision of women, and in related research.

295 **Independent Research in Women Studies** (arr.) Staff

Supervised independent research. Students will be expected to contribute to the present body of knowledge in the historical, literary, or statistical study of women.

299–300 **Thesis Research** (3–3)

Zoology

See "Biological Sciences."

FACULTY AND STAFF OF INSTRUCTION

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

GRADUATE SCHOOL OF ARTS AND SCIENCES

SCHOOL OF EDUCATION

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

EMERITI

Caroline Lander Adams, *Professor Emeritus of Botany*
B.A. 1925, Illinois College; M.S. 1928, University of Chicago; Ph.D. 1932, University of Wisconsin-Madison

Errett Cyril Albritton, *Professor Emeritus of Physiology*
B.A. 1916, University of Missouri-Columbia; M.D. 1921, Johns Hopkins University

Grover LaMarr Angel, *Professor Emeritus of Education*
B.A. 1929, High Point College; M.A. in Ed. 1946, Ed.D. 1952, George Washington University

Ruth Harriet Atwell, *Professor Emeritus of Physical Education for Women*
Ph.B. 1918, Denison University; M.A. in Ed. 1933, George Washington University

Gretchen Rogers Bolwell, *Professor Emeritus of German*
B.A. 1930, M.A. 1931, George Washington University; Ph.D. 1938, Johns Hopkins University

Robert Whitney Bolwell, *Professor Emeritus of American Literature*
B.A. 1916, Case Western Reserve University; M.A. 1917, Ph.D. 1921, Columbia University; Litt.D. 1957, George Washington University

Paul William Bowman, *Professor Emeritus of Biology*
B.A. 1924, University of Pennsylvania; M.A. 1928, George Washington University; Ph.D. 1[illegible] University of Virginia

John Withrow Brewer, *Professor Emeritus of Political Science and International Law*
B.A. 1926, M.A. 1930, Ph.D. 1932, Princeton University

Arthur Edward Burns, *Professor Emeritus of Economics*
B.A. 1931, M.A. 1934, University of California, Berkeley; Ph.D. 1935, George Washington University

Elizabeth Burtner, *Professor Emeritus of Physical Education*
B.A. 1927, Hood College; M.A. 1935, Columbia University

Paul Calabrisi, *Professor Emeritus of Anatomy*
B.A. 1931, Catholic University of America; M.A. 1940, George Washington University; Ph.D. (Cantab.) 1955, University of Cambridge, England

Richard Bernard Castell, *Director Emeritus of the Student Health Service*
B.A. 1932, M.D. 1935, George Washington University

James Harold Coberly, *Professor Emeritus of English*
B.A. 1933, M.A. 1938, Ph.D. 1949, George Washington University

Elbridge Colby, *Professor Emeritus of Journalism*
B.A. 1912, M.A. 1913, Ph.D. 1922, Columbia University

Oswald Symister Colclough, *Professor Emeritus of Law; Dean of Faculties Emeritus; Emeritus Director of the Patent, Trademark, and Copyright Research Institute*
B.S. 1920, U.S. Naval Academy; LL.B. 1935, Sc.D. 1961, George Washington University; LL.D. 1946, Muhlenberg College

Charles William Cole, *Professor Emeritus of English*
B.A. 1930, M.A. 1931, Ph.D. 1939, George Washington University

George Frederick Conner, *Associate Professor Emeritus of Business Administration*
B.S. 1929, U.S. Military Academy; M.B.A. 1938, Harvard University

Vincent James DeAngelis, *Professor Emeritus of Physical Education*
B.S. in P.E. 1939, M.A. in Ed. 1948, George Washington University

Alan Thomas Deibert, *Professor Emeritus of Romance Languages*
B.A. 1918, Gettysburg College; M.A. 1922, Harvard University

William Webster Diehl, *Professor Emeritus of Mycology*
B.A. 1914, Miami University; M.S. 1915, Iowa State University of Science and Technology; Ph.D. 1932, Harvard University

James Carlton Dockeray, *Professor Emeritus of Finance*
B.A. 1929, Ohio Wesleyan University; M.A. 1931, Ph.D. 1936, Ohio State University

William Rankin Duryee, *Research Professor Emeritus of Pathology (Experimental)*
B.A. 1927, Ph.D. 1933, Yale University

Charles Edward Galbreath, *Professor Emeritus of International Economics*
B.A. 1931, Colgate University; M.A. 1932, Ph.D. 1969, George Washington University

Frederick Harrell Gibbs, *Professor Emeritus of Health Care Administration*
B.S. 1958, University of Maryland; M.H.A. 1959, University of Minnesota

Wood Gray, *Professor Emeritus of American History*
B.A. 1927, M.A. 1928, University of Illinois at Urbana-Champaign; Ph.D. 1933, University of Chicago

Ira Bowers Hansen, *Professor Emeritus of Zoology*
B.S. 1928, M.A. 1929, Wesleyan University; Ph.D. 1932, University of Chicago

Henry William Herzog, *Vice President and Treasurer Emeritus*
B.S. in C.E. 1930, George Washington University

Thomas Willard Holland, *Professor Emeritus of Labor Economics*
B.A. 1923, University of Michigan; LL.B. 1934, Columbia University; Ph.D. 1939, University of Wisconsin-Madison

Averett Howard, *Professor Emeritus of English Composition*
B.A. 1922, University of California, Berkeley; M.A. 1940, Cornell University

Thelma Hunt, *Professor Emeritus of Psychology, in Residence*
B.A. 1924, M.A. 1925, Ph.D. 1927, M.D. 1935, George Washington University

Herbert Jehle, *Professor Emeritus of Physics*
Dr.Ing. 1933, Institute of Technology, Berlin

Everett Herschel Johnson, *Professor Emeritus of Statistics*
B.A. 1926, DePauw University; M.A. 1929, Lehigh University; Ph.D. 1942, University of Michigan

Francis Edgar Johnston, *Professor Emeritus of Mathematics*
B.A. 1921, George Washington University; M.A. 1923, Ph.D. 1926, University of Illinois at Urbana-Champaign

Elmer Louis Kayser, *Professor Emeritus of European History; Dean Emeritus of the Division of University Students*
B.A. 1917, M.A. 1918, LL.D. 1948, George Washington University; Ph.D. 1932, Columbia University

Frances Kirkpatrick, *Professor Emeritus of Home Economics*
B.S. 1919, University of Missouri-Columbia; M.A. 1929, Columbia University

Donald Chenoweth Kline, *Professor Emeritus of Art, in Residence*
B.Arch. 1927, George Washington University; M.F.A. 1951, Catholic University of America

George Martin Koehl, *Professor Emeritus of Physics*
B.A. 1931, University of North Carolina at Chapel Hill; M.A. 1933, George Washington Univer

Wolfgang Herbert Kraus, *Professor Emeritus of Political Science and International Affairs*
Dr.Jur. 1929, University of Frankfurt; S.J.D. 1931, Harvard University

Solomon Kullback, *Professor Emeritus of Statistics*
B.S. 1927, City University of New York, City College; M.A. 1929, Columbia University; Ph. 1934, George Washington University

John Francis Latimer, *Professor Emeritus of Classics*
B.A. 1922, Litt.D. 1964, Mississippi College; M.A. 1926, University of Chicago; Ph.D. 19 Yale University

Helen Bennett Lawrence, *Professor Emeritus of Physical Education for Women*
B.S. in P.E. 1934, M.A. 1938, George Washington University

Chester Elwood Leese, *Professor Emeritus of Physiology*
B.A. 1922, M.A. 1925, Ph.D. 1930, University of Iowa

Wolfram Karl Legner, *Professor Emeritus of German*
B.A. 1923, Harvard University; M.A. 1932, Ph.D. 1936, University of Pennsylvania

Laurence Pereira Leite, *Professor Emeritus of Art, in Residence*
M.A. 1956, Ph.D. 1966, Johns Hopkins University

Kurt London, *Professor Emeritus of International Affairs*
Ph.D. 1923, University of Würzburg

John Russell Mason, *Librarian Emeritus; Curator of Art Emeritus*
B.A. 1923, M.A. 1925, George Washington University; M.S. in L.S. 1933, Columbia Univer

Florence Marie Mears, *Professor Emeritus of Mathematics*
B.A. 1917, Goucher College; M.A. 1924, Ph.D. 1927, Cornell University

Howard Maxwell Merriman, *Professor Emeritus of American Diplomatic History*
B.A. 1930, M.A. 1931, University of Cincinnati; M.A. 1932, Ph.D. 1937, Harvard Univ

Edith Elizabeth Mortensen, *Professor Emeritus of Zoology*
B.A. 1925, Carleton College; M.A. 1927, University of Minnesota; Ph.D. 1945, George Washing University

Sam Clark Munson, *Professor Emeritus of Biology*
B.S. 1930, M.S. 1931, Mississippi State University; Ph.D. 1952, University of Maryland

William Henry Myers, *Professor Emeritus of Physical Education, Health, and Recreation for Men*
B.A. 1931, Occidental College; M.A. in Ed. 1941, George Washington University

Richard Norman Owens, *Professor Emeritus of Business Administration*
B.A., B.S. 1917, University of Missouri-Columbia; M.A. 1922, Ph.D. 1928, University of Chica C.P.A. 1923, State of Illinois

Thomas Martin Peery, *Professor Emeritus of Pathology*
B.A. 1928, D.M.S. 1966, Newberry College; M.D. 1932, Medical University of South Caroli

Lois Irene Platt, *Associate Professor Emeritus of Pathology*
B.A. 1931, Goucher College; M.D. 1946, University of Maryland

Blake Smith Root, *Professor Emeritus of Education*
B.S. 1927, Monmouth College, Illinois; M.A. 1931, University of Illinois at Urbana-Champa Ed.D. 1948, George Washington University

Myrna Pauline Sedgwick, *Administrative Secretary Emeritus*
B.A. 1911, Wellesley College

Edward Henry Sehrt, *Professor Emeritus of German*
B.A. 1911, Ph.D. 1915, Johns Hopkins University

Ernest Sewall Shepard, *Professor Emeritus of English Literature*
B.A. 1925, M.A. 1927, George Washington University

Waldo Sommers, *Professor Emeritus of Public Administration, in Residence*
B.A. 1927, Heidelberg College; M.A. 1934, Ph.D. 1948, Yale University

Karl Ernest Stromsem, *Professor Emeritus of Public Administration*
B.A. 1930, Pomona College; Ph.D. 1935, University of California, Berekeley

Harold Griffith Sutton, *Director of Admissions Emeritus*
B.A. 1918, Ohio State University; M.S. 1921, Columbia University

Ira Rockwood Telford, *Professor Emeritus of Anatomy*
B.A. 1931, M.A. 1933, University of Utah, Ph.D. 1942, George Washington University

Kathryn Mildred Towne, *Professor Emeritus of Home Economics*
B.S. 1923, Montana State University; M.A. 1930, Columbia University

Donald Stevenson Watson, *Professor Emeritus of Economics*
B.A. 1930, University of British Columbia; Ph.D. 1935, University of California, Berkeley

Frank Mark Weida, *Professor Emeritus of Statistics*
B.S. 1913, Kenyon College; Ph.D. 1923, University of Iowa

Warren Reed West, *Professor Emeritus of Political Science*
B.A. 1918, George Washington University; Ph.D. 1922, Johns Hopkins University

Ralph Kirby White, *Professor Emeritus of Social Psychology, in Residence*
B.A. 1929, Wesleyan University; Ph.D. 1937, Stanford University

Samuel Nathaniel Wrenn, *Professor Emeritus of Chemistry*
B.A. 1927, M.A. 1929, Duke University; Ph.D. 1935, Pennsylvania State University

Lawson Edwin Yocum, *Professor Emeritus of Botany*
B.S. 1916, Pennsylvania State University; M.S. 1920, Ph.D. 1924, University of Northern Iowa

Donnell Brooks Young, *Professor Emeritus of Zoology*
B.S. 1911, Amherst College; Ph.D. 1923, Columbia University

ACTIVE*

Fred Paul Abramson, *Assistant Research Professor of Pathology and of Pharmacology*
B.A. 1962, Case Western Reserve University; Ph.D. 1965, Ohio State University

Eugene Abravanel, *Associate Professor of Psychology*
B.A. 1955, University of Michigan; M.A. 1960, Swarthmore College; Ph.D. 1965, University of California, Berkeley

Michael Jan Ackerman, *Adjunct Assistant Professor of Health Care Administration*
B.A. 1966, Hofstra University; M.A. 1969, Clark University; Ph.D. 1971, University of North Carolina at Chapel Hill

Alice Anderson Adams, *Assistant Clinical Professor of Psychology*
B.F.A. 1948, Ph.D. 1959, University of Oklahoma

Elizabeth Byrne Adams, *Associate Professor of Management*
B.S. 1955, City University of New York, Queens College, M.A. in Ed. 1957, George Washington University; Ph.D. 1974, American University

Lewis Francis Affronti, *Professor of Microbiology*
B.A. 1950, M.A. 1951, State University of New York at Buffalo; Ph.D. 1958, Duke University

Ernest Narinder Albert, *Associate Professor of Anatomy*
B.S. 1959, High Point College, M.S. 1963, University of Pittsburgh; Ph.D. 1965, Georgetown University

Yousef Al-Doory, *Associate Professor of Epidemiology and Environmental Health and of Pathology*
B.S. 1945, University of Baghdad; M.A. 1951, University of Texas at Austin; Ph.D. 1954, Louisiana State University and Agricultural and Mechanical College

Charles Edward Alexander, Jr., *Associate Professorial Lecturer in Epidemiology and Environmental Health*
B.A. 1951, Yale University; M.D. 1955, University of Pennsylvania; M.P.H. 1959, D.P.H. 1964, Johns Hopkins University

* The University Faculty is composed of the President of the University, the Vice President for Academic Affairs, the Director of Admissions, the Registrar, the University Librarian, the Treasurer, the Director of the Student Health Service, and the membership of the several college and school faculties.

Frank Duane Allan, *Professor of Anatomy*
B.S. 1947, M.S. 1949, University of Utah; Ph.D. 1954, Louisiana State University and Agricultural and Mechanical College

John Gage Allee, Jr., *Professor of English; Dean of the Division of University Students*
B.A. 1939, M.A. 1940, George Washington University; Ph.D. 1955, Johns Hopkins University

Richard Chester Allen, *Professor of Law*
B.A. 1948, J.D. 1950, Washington University; LL.M. 1963, University of Michigan

David Aron Altshuler, *Assistant Professor of Religion*
B.A., M.A. 1971, Brown University

Frederick Amling, *Professor of Business Finance*
B.A. 1948, Baldwin-Wallace College; M.B.A. 1949, Miami University; Ph.D. 1957, University of Pennsylvania

Avery Delano Andrews II, *Assistant Professor of History*
B.A. 1950, Harvard University; LL.B. 1953, M.A. 1958, Ph.D. 1962, University of Pennsylvania

John Lawrence Angel, *Professorial Lecturer in Anatomy and Anthropology*
B.A. 1936, Ph.D. 1942, Harvard University

Tatiana Antonovych, *Professorial Lecturer in Pathology*
M.D. 1941, University of Vienna

Daniel Appleman, *Professorial Lecturer in Geology*
B.S. 1953, California Institute of Technology; M.A. 1954, Ph.D. 1956, Johns Hopkins University

R. Victoria Arana-Robinson, *Lecturer in English*
B.A. 1966, Vassar College

Fairlie Arant, *Assistant Professorial Lecturer in Speech*
B.A. 1957, Wellesley College; M.A. 1961, Columbia University; Ph.D. 1971, University of Minnesota

William Earl Arsers, *Studio Lecturer in Applied Music (French Horn)*

*Joseph Aschheim, *Professor of Economics*
B.A. 1951, University of California, Berkeley; M.A. 1953, Ph.D. 1954, Harvard University

David Lynn Atkins, *Associate Professor of Biology*
B.A. 1957, University of Texas at Austin; M.A. 1963, East Texas State University; Ph.D. 1970, Texas A&M University

William Johnson Auton, *Adjunct Assistant Professor of Health Care Administration*
B.B.A. 1965, George Washington University; M.A. 1966, Roosevelt University

Julius Axelrod, *Distinguished Professor of Science; Professorial Lecturer in Pharmacology*
B.S. 1933, City University of New York, City College; M.A. 1941, New York University; Ph.D. 1955, LL.D. 1971, George Washington University; Sc.D. 1966, University of Chicago

Ines Azar, *Assistant Professor of Spanish*
M.A. 1969, Ph.D. 1974, Johns Hopkins University

Joseph Baclawski, *Professorial Lecturer in Geography*
B.A. 1947, M.A. 1948, Ph.D. 1951, University of Michigan

John Martyn Bailey, *Professor of Biochemistry*
B.S. 1949, Ph.D. 1952, D.Sc. 1970, University of Wales

Robert Edward Baker, *Professor of Education; Assistant Dean of the School of Education*
B.S. in Ed. 1939, State University of New York at Buffalo; M.A. 1954, Catholic University of America; M.A. in Ed. 1956, Ed.D. 1962, George Washington University

Edith Louise Ball, *Professorial Lecturer in Human Kinetics and Leisure Studies*
B.S. 1926, M.A. 1927, Columbia University; Ed.D. 1953, New York University

James Elmer Banta, *Professorial Lecturer in Epidemiology and Environmental Health*
M.D. 1950, Marquette University; M.P.H. 1954, Johns Hopkins University

Ruth Lillian Aaronson Bari, *Associate Professor of Mathematics*
B.A. 1939, City University of New York, Brooklyn College; M.A. 1943, Ph.D. 1966, Johns Hopkins University

---

* On sabbatical leave fall semester 1975.

Shirley Russell Barnett, *Assistant Professor of Spanish*
B.A. 1944, Vassar College; M.A. 1946, Vanderbilt University; Ph.D. 1958, University of Minnesota

Richard Adrian Barrett, *Professor of Business Administration; Director, Navy Graduate Financial Management Program*
B.A. 1930, Amherst College; M.B.A. 1932, Harvard University; D.B.A. 1972, George Washington University

James Richard Barth, *Associate Professor of Economics*
B.A. 1965, California State University at Sacramento; M.A. 1967, University of New Mexico; Ph.D. 1972, Ohio State University

Elio Lee Battaglia, *Assistant Professorial Lecturer in Photography*
B.J. 1958, M.A. 1968, University of Missouri-Columbia

John Bruce Bauman, *Assistant Professorial Lecturer in Jouralism*

Bruce Becker, *Associate Clinical Professor of Psychology*
B.A. 1950, St. Ambrose College; M.A. 1954, St. Louis University; Ph.D. 1962, Loyola University of Chicago

Norman Beckman, *Professorial Lecturer in Urban and Regional Planning*
B.A. 1949, City University of New York, Brooklyn College; M.A. 1952, Syracuse University; Ph.D. 1957, Columbia University

David Booth Beers, *Assistant Professorial Lecturer in Classics*
B.A. 1957, Trinity College, Connecticut; M.A., LL.B. 1960, University of California, Berkeley

Fernando Belaunde-Terry, *Visiting Professor of Urban History and Planning*
B.Arch. 1935, University of Texas at Austin; Doctor honoris causa 1964, National Agrarian University, Peru; LL.D. 1969, Hamilton College

Salvatore John Bellomo, *Associate Professorial Lecturer in Urban and Regional Planning*
B.S. 1963, Rutgers University, New Brunswick; M.C.E. 1967, D.Engr. 1971, Catholic University of America

Bruce Benefield, *Associate Professorial Lecturer in Business Administration*
B.B.A. 1951, University of Miami; M.S. 1964, Air Force Institute of Technology; D.B.A. 1968, Harvard University

James Daniel Bentley, *Adjunct Assistant Professor of Health Care Administration*
B.A. 1967, Michigan State University; Ph.D. 1971, University of Michigan

Clifford Leonard Berg, *Professorial Lecturer in Public Administration*
B.A. 1942, University of Minnesota; M.P.A. 1951, Ph.D. 1955, Harvard University

Otto Bergmann, *Professor of Physics*
Ph.D. 1949, University of Vienna

David Francis Bergwall, *Instructor in Health Care Administration*
B.A. 1969, M.B.A. 1970, Ball State University

Howard Hillel Berman, *Assistant Clinical Professor of Pathology*
B.A. 1958, Duke University; M.D. 1962, Columbia University

Sharron Martin Bickel, *Lecturer in Russian*
B.A. 1964, M.A. 1966, University of Colorado

Lee Sheward Bielski, *Associate Professor of Speech*
B.S. 1940, Ohio University; M.A. 1944, University of Michigan

Philip Stanley Birnbaum, *Adjunct Associate Professor of Health Care Administration*
B.S. in M.E. 1948, M.S. in M.E. 1949, Carnegie-Mellon University; B.C.E. 1954, Rensselaer Polytechnic Institute

Calvin Franklin Bishop, *Clinical Professor of Pathology (Laboratory Medicine)*
B.S. 1950, Baylor University; M.D. 1953, University of Texas, Southwestern Medical School at Dallas

Guy Black, *Professor of Business Economics*
B.S. 1941, Harvard University; M.A. 1948, Ph.D. 1951, University of Chicago

Brian Douglas Blackbourne, *Assistant Clinical Professor of Pathology (Forensic)*
M.D. 1962, University of Alberta

Ethel Joan Blanchette-Mackie, *Associate Professorial Lecturer in Anatomy*
B.S. 1956, City University of New York, Queens College; M.S. 1959, New York University; Ph.D. 1965, Columbia University

Dick Edmund Blessing, *Special Lecturer in Pathology*

Elliot Blum, *Associate Clinical Professor of Psychology*
B.B.A. 1958, City University of New York, City College; M.S. 1960, Long Island Universi
Ph.D. 1965, Florida State University

Joseph Blum, *Professorial Lecturer in Mathematics*
B.S. 1940, City University of New York, City College; M.A. 1948, Ph.D. 1958, George Wash
ington University

Joe Morris Blumberg, *Clinical Professor of Pathology*
B.S. 1930, M.D. 1933, Emory University

Margaret Emma Boeckmann, *Assistant Professor of Sociology*
B.A. 1964, Barnard College; M.A.T. 1965, Ph.D. 1973, Johns Hopkins University

George Pierce Bogumill, *Assistant Clinical Professor of Orthopaedic Surgery and of Anatomy*
B.S. 1952, M.S. 1954, Ph.D. 1955, M.D. 1959, University of Wisconsin-Madison

Roland Richard Bonato, *Associate Research Professor of Health Care Administration*
B.A. 1954, Case Western Reserve University; M.A. 1957, Ph.D. 1961, University of Connecticut

John Borriello, *Associate Clinical Professor of Psychology*
B.A. 1952, M.Ed. 1953, Boston University; Ph.D. 1957, University of Minnesota

Sally Webster Boss, *Assistant Professorial Lecturer in Education*
B.S. 1962, Case Western Reserve University; M.S. 1971, Bowling Green State University

John Gordon Boswell, *Professor of Education*
B.A. in Ed. 1953, M.A. in Ed. 1956, Ed.D. 1963, George Washington University

Perry Botwin, *Professor of Special Education*
B.S. 1942, Rutgers University, New Brunswick; M.A. 1947, New York University; Ed.D. 1955, Columbia University

Lloyd Spencer Bowling, *Professor of Speech and Hearing*
B.A. 1954, M.A. 1957, Ed.D. 1964, University of Maryland

Thomas Elliot Bowman, *Adjunct Professor of Biological Sciences*
B.S. 1941, Harvard University; M.A. 1948, University of California, Berkeley; Ph.D. 1954, University of California, Los Angeles

George Robert Bozzini, *Assistant Professor of English*
B.S. 1961, Ph.D. 1971, Georgetown University

Linda Brandt-Emler, *Assistant Professor of Psychology*
B.A. 1963, Elmhurst College; M.A. 1965, Clark University; Ph.D. 1973, University of London

James Lowell Breen, *Professor of Human Kinetics and Leisure Studies*
B.S. 1948, Eastern Illinois University; M.S. 1949, Ph.D. 1959, University of Illinois at Urbana-Champaign

Gloria Godbey Brennan, *Assistant Clinical Professor of Pathology*
B.A. 1949, M.D. 1952, George Washington University

*Marcella Brenner, *Professor of Education*
B.S. in Ed. 1954, Johns Hopkins University; M.A. 1949, American University; Ed.D. 1962, George Washington University

Alexander Breslow, *Professor of Pathology*
B.S. 1948, M.S., M.D. 1953, University of Chicago

Mary Diane Majerus Brewer, *Assistant Professor of Speech*
B.A. 1963, M.A. 1965, University of Iowa

Harold Frederick Bright, *Professor of Statistics; Provost and Vice President for Academic Affairs*
B.A. 1937, Lake Forest College; M.S. 1944, University of Rochester; Ph.D. 1952, University of Texas at Austin

†A. D. Britt, *Associate Professor of Chemistry*
B.S. 1957, West Texas State University; M.A. 1961, Ph.D. 1963, Washington University

John Caruthers Broderick, *Adjunct Professor of English*
B.A. 1948, Southwestern at Memphis; M.A. 1949, Ph.D. 1953, University of North Carolina at Chapel Hill

---

* On leave of absence spring semester 1976.
† On sabbatical leave spring semester 1976.

Stuart Lee Brodsky, *Associate Professorial Lecturer in Mathematics*
B.S. 1964, Illinois Institute of Technology; M.S. 1965, Ph.D. 1969, Stanford University

Elna Riker Broffman, *Lecturer in English*
B.A. 1951, Beaver College; M.A. 1953, Columbia University

Alison Spence Brooks, *Assistant Professor of Anthropology*
B.A. 1965, Radcliffe College; M.A. 1967, Harvard University

David Springer Brown, *Professor of Management*
B.A. 1936, University of Maine at Orono; Ph.D. 1955, Syracuse University

Laurence Ray Brown, *Assistant Professorial Lecturer in Business Administration*
B.S. in Engr. 1949, D.B.A. 1968, George Washington University; LL.B. 1951, Rutgers University, Camden; M.S. in E.E. 1958, University of Pennsylvania

*Letitia Woods Brown, *Professor of American History and Civilization*
B.S. 1935, Tuskegee Institute; M.A. 1937, Ohio State University; Ph.D. 1966, Harvard University

Robert Guy Brown, *Professor of Sociology*
B.A. 1949, University of Rhode Island; M.A. 1951, Ph.D. 1960, University of North Carolina at Chapel Hill

Sarah Eleanor Brown, *Assistant Professorial Lecturer in Forensic Sciences*
B.A. 1958, Vassar College; LL.B. 1963, Georgetown University

Richard Brunelle, *Associate Professorial Lecturer in Forensic Sciences*
B.A. 1960, Clark University; M.S. 1972, George Washington University

John Alva Bull III, *Assistant Professor of Psychology*
B.A. 1964, M.S. 1965, Central Washington State College; Ph.D. 1969, University of Minnesota

Ben Burdetsky, *Professorial Lecturer in Business Administration*
B.S. 1950, M.S. 1958, Temple University; Ph.D. 1968, American University

David Warren Burkett, *Associate Professorial Lecturer in Journalism*
B.J. 1951, M.J. 1965, University of Texas at Austin

Elisabeth Ann Burkhardt, *Lecturer in Human Kinetics and Leisure Studies*
B.S. 1966, University of Maryland

James Franklin Burks, *Professor of French*
B.A. 1951, M.A. 1952, University of Cincinnati; Ph.D. 1957, Indiana University at Bloomington

Stephen Wheeler Burks, *Assistant Professor of Political Science and Public Affairs*
B.A. 1962, Stanford University; M.A. 1969, Ph.D. 1972, Michigan State University

Willard Ambrose Burns, *Associate Professor of Pathology*
B.S. 1951, Fordham University; M.D. 1958, University of Lausanne, Switzerland

William Wesley Burr, Jr., *Professorial Lecturer in Biochemistry (Isotopes)*
B.A. 1947, University of Nebraska; M.S. 1948, Ph.D. 1951, University of Illinois at Urbana-Champaign; M.D. 1960, University of Texas Southwestern Medical School at Dallas

Ann Benedict Butler, *Assistant Professor of Anatomy*
B.A. 1967, Oberlin College; Ph.D. 1971, Case Western Reserve University

Martin Alexander Buzas, *Associate Professorial Lecturer in Geology*
B.A. 1958, University of Connecticut; M.S. 1960, Brown University; Ph.D. 1963, Yale University

Eugene Cyril Cager, *Special Lecturer in Pathology*

Willard Edmund Caldwell, *Professor of Psychology*
B.A. 1940, M.A. 1941, University of Florida; Ph.D. 1946, Cornell University

Agnes Virginia Cannon, *Assistant Professor of English*
B.S. in Ed. 1945, West Virginia University; M.A. 1962, Ph.D. 1968, University of Pennsylvania

Yale Howard Caplan, *Associate Professorial Lecturer in Forensic Sciences*
B.S. in Phar. 1963, Ph.D. 1968, University of Maryland

Edward Alan Caress, *Associate Professor of Chemistry; Assistant Dean of the Graduate School of Arts and Sciences*
B.A. 1958, Dartmouth College; Ph.D. 1963, University of Rochester

Faith Coles Carman, *Studio Lecturer in Applied Music (Harp)*
Mus.B. 1963, Catholic University of America

Rose Friedman Caron, *Adjunct Professor of Psychology*
B.A. 1948, Vassar College; M.A. 1950, Ph.D. 1955, University of Chicago

* On sabbatical leave academic year 1975-76.

Thomas Douglas Carpenter, *Special Lecturer in Pathology*

James Harrison Hewes Carrington, *Associate Professor of Business Administration*
B.S. 1948, U.S. Naval Academy; M.B.A. 1964, George Washington University; Ph.D 19 American University

Gerald Vincent Carroll, *Professor of Geology*
B.A. 1943, Lehigh University; Ph.D. 1952, Yale University

Janet Schall Carroll, *Lecturer in English*
B.A. 1968, George Washington University

Thomas Frank Carroll, *Adjunct Professor of Economics*
B.A. 1942, Case Western Reserve University; M.S. 1947, Ph.D. 1950, Cornell University

Wesley Thomas Carroll, *Professor of Education*
B.S. 1933, Iowa State University of Science and Technology; M.A. 1940, Ph.D. 1952, University Nebraska

Franklin Wood Carter, *Adjunct Instructor in Health Care Administration*
B.S. in Gen. Std. 1970, M.B.A. 1971, George Washington University

Geoffrey Carter, *Assistant Professor of English*
B.A. 1963, University of Cambridge; Ph.D. 1969, University of Pennsylvania

Marie Mullaney Cassidy, *Professor of Physiology*
B.S. (General) 1957, B.S. (Special) 1958, M.S. 1959, Ph.D. 1962, National University of Ireland

Michael Scott Castleberry, *Assistant Professor of Special Education*
B.A. 1966, University of North Carolina at Chapel Hill; M.A. in Ed. 1972, Ed.D. 1973, George Washington University

Bayard Lacey Catron, *Assistant Professor of Public Administration*
B.A. 1963, Grinnell College; M.A. 1965, University of Chicago; M.C.P. 1972, University of California, Berkeley

Soo Young Cha, *Assistant Professorial Lecturer in Human Kinetics and Leisure Studies*
B.A. 1961, Seoul National University

Fenner Albert Chace, Jr., *Adjunct Professor of Biological Sciences*
B.A. 1930, M.A. 1931, Ph.D. 1934, Harvard University

Roma Sakhuja Chandra, *Special Lecturer in Child Health and Development and in Pathology*
M.B., B.S. 1958, Lady Hardinge Medical College, India

William Weymouth Chase, *Professorial Lecturer in Education*
B.A. 1948, M.A. 1949, Colorado State College; Ed.D. 1956, Indiana University at Bloomington

George Cheely, *Associate Professorial Lecturer in Journalism*
B.S. 1952, University of Maryland

William Robert Chiarulli, *Special Lecturer in Epidemiology and Environmental Health*

Stephen Reed Chitwood, *Associate Professor of Public Administration*
B.A. 1962, University of Colorado; M.P.A. 1965, Ph.D. 1966, University of Southern California

Linda Diane Christofferson, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1971, University of Wyoming

Yang-Ming Chu, *Assistant Professor of Microbiology*
B.S. 1959, University of Washington; M.S. 1964, Ph.D. 1967, George Washington University

Robert Edward Cipriano, *Assistant Research Professor of Human Kinetics and Leisure Studies*
B.A. 1967, M.A. 1968, Morehead State University

Ira Hubert Cisin, *Professor of Sociology*
B.S. 1939, New York University; M.A. 1951, Ph.D. 1957, American University

Astere Evarist Claeyssens, Jr., *Associate Professor of English*
B.A. 1948, University of Illinois at Urbana-Champaign; M.A. 1952, Columbia University

Sharon Leigh Clark, *Associate Professor of Human Kinetics and Leisure Studies*
B.S. 1955, University of Maine at Orono; Ed.M. 1965, Springfield College; Ph.D. 1973, New York University

Patricia Ann Cleary, *Research Instructor in Health Care Administration*
B.A. in Ed. 1966, M.S. 1968, George Washington University

Carl William Clewlow, *Professorial Lecturer in Management Science*
B.A. in Govt. 1949, M.A. in Govt. 1951, George Washington University

*Anthony George Coates, *Professor of Geology*
B.S. 1959, Ph.D. 1963, University of London

Joseph Francis Coates, *Professorial Lecturer in Management Science and Public Affairs*
B.S. 1951, Polytechnic Institute of Brooklyn; M.S. 1953, Pennsylvania State University

Mary Ann Bieter Coffland, *Associate Professor of Romance Languages*
B.A. 1952, College of St. Catherine; M.A. 1957, Ph.D. 1965, University of Minnesota

Stanley Lee Cohen, *Associate Professorial Lecturer in Psychology*
B.A. 1963, M.A. 1966, Ph.D. 1971, George Washington University

Alvin Walter Cohn, *Associate Professorial Lecturer in Forensic Sciences*
B.A. 1956, University of Cincinnati; M.A. 1960, Indiana University; D.Crim. 1972, University of California, Berkeley

Victor Hugo Cohn, Jr., *Professor of Pharmacology*
B.S. 1952, Lehigh University; M.A. 1954, Harvard University; Ph.D. 1961, George Washington University

James Coldsmith, *Assistant Professorial Lecturer in Journalism*
B.A. 1950, Baker University; M.S.J. 1951, Northwestern University

Richard Louis Cole, *Assistant Professor of Political Science and Public Affairs*
B.A. 1967, M.A. 1969, North Texas State University; Ph.D. 1973, Purdue University

Mary Ellen Coleman, *Professor of Education*
B.S. 1937, Madison College; M.A. in Ed. 1950, George Washington University

Calva Kephart Collier, *Lecturer in Human Kinetics and Leisure Studies*
B.S. in P.E. 1949, George Washington University

Frederick Joseph Collier, *Assistant Professorial Lecturer in Geology*
B.S. 1958, Tufts University

Leonard Cornelius Collins, *Professorial Lecturer in Business Administration*
B.A. 1943, Boston College; LL.B. 1946, Catholic University of America; LL.M. 1953, Georgetown University

Robert Long Combs, *Assistant Professor of English*
B.A. 1968, University of Southern Mississippi; Ph.D. 1971, University of South Carolina

Craig Cole Conboy, *Special Lecturer in Pathology*

Ivan Willard Conrad, *Professorial Lecturer in Forensic Sciences*
B.A. 1932, M.A. 1933, Indiana University at Bloomington

Charles Barrie Cook, *Associate Clinical Professor of Pathology*
B.S. 1945, Hampden-Sydney College; M.D. 1948, George Washington University

Howard Lee Coppenbarger, *Professorial Lecturer in Journalism*

Jerome Cornfield, *Professor of Statistics*
B.S. 1933, New York University

Francis Vincent Corrigan, *Assistant Professorial Lecturer in Education*
B.A. 1959, Providence College; Ed.M. 1961, Boston University; Ed.D. 1970, George Washington University

Erminio Costa, *Professorial Lecturer in Pharmacology*
M.D. 1947, University of Cagliari, Italy

Raymond Sheary Cottrell, Jr., *Associate Professor of Special Education*
B.S. 1955, State University of New York at Albany; M.S. 1959, Ed.D. 1967, Syracuse University

Raymond Leslie Courage, *Associate Professorial Lecturer in Journalism*
B.A. 1949, M.A. 1951, University of Michigan

* On sabbatical leave academic year 1975-76.

Thomas Francis Courtless, Jr., *Professor of Law and Sociology*
B.A. 1955, Pennsylvania State University; M.A. 1960, Ph.D. 1966, University of Maryland

Bernard Patrick Cox, *Associate Professorial Lecturer in Speech*
B.A. 1963, George Washington University; M.S. 1966, Ph.D. 1969, University of Pittsburgh

Elizabeth Campbell Cox, *Assistant Professor of Public Administration*
Mus.B. 1950, University of Tennessee at Chattanooga; M.U.R.P. 1973, University of Pittsburgh

John Patrick Coyne, *Assistant Professor of Management Science*
B.S. 1967, Iona College; M.S. 1968, Ph.D. 1970, Lehigh University

Adelbert DeVere Cramer, *Associate Clinical Professor of Pathology (Blo*
Banking)
B.S. in Ed. 1950, B.A. 1956, M.D. 1960, University of Kansas

Milton Crane, *Professor of English*
B.A. 1937, M.A. 1938, Columbia University; M.A. 1941, Ph.D. 1942, Harvard University

Clare Wootten Crawford, *Associate Professorial Lecturer in Journalism*
B.A. 1958, University of Maryland

Patrick Joseph Creaven, *Special Lecturer in Pharmacology*
M.B., B.S. 1956, Ph.D. 1964, University of London

Richmond Dillard Crinkley, *Professorial Lecturer in Speech*
B.A. 1961, M.A. 1962, Ph.D. 1966, University of Virginia

Patricia Bell Barr Crowe, *Assistant Clinical Professor of Psychology*
B.A. 1962, M.A. 1967, Ph.D. 1972, George Washington University

Sally Ann Carlson Crowell, *Lecturer in Human Kinetics and Leisure Studies*
B.F.A. 1966, Howard University

David Allan Crown, *Professorial Lecturer in Forensic Sciences*
B.S. 1948, Union College; M.Crim. 1960, D.Crim. 1969, University of California

Jonathan Walkley Cummings, *Associate Clinical Professor of Psychology*
B.A. 1949, University of Vermont; Ph.D. 1954, University of Illinois at Urbana-Champaign

Phyllis Deutsch Daen, *Associate Clinical Professor of Psychology*
B.S. 1950, City University of New York, Queens College; Ph.D. 1960, Adelphi University

Hilding Laurel Dahlgren, *Lecturer in Forensic Sciences*
B.A. 1935, Gustavus Adolphus College

John William Dailey, *Assistant Professor of Pharmacology*
B.S. in Phar. 1966, University of Maryland; Ph.D. 1971, University of Virginia

Robert Emmett Darcy, *Assistant Professor of Political Science and Publ*
Affairs
B.A. 1965, University of Wisconsin-Madison; M.A. 1970, Ph.D. 1971, University of Kentucky

Dwight David Darland, *Professorial Lecturer in Education*
B.S. 1939, Wayne State College; M.A. 1942, University of Wyoming; Ed.D. 1947, Columbia University

Kurt John Darr, *Associate Professor of Health Care Administration*
B.A. 1961, Concordia College, Minnesota; J.D. 1964, M.H.A. 1966, University of Minnesot
D.Sc. 1973, Johns Hopkins University

Calvin O'Neil Dash, *Studio Lecturer in Applied Music (Voice)*
B.S. 1951, M.S. 1952, Juilliard School of Music; A.Mus.D. 1962, Eastman School of Music

Roderic Hollett Davison, *Professor of European History*
B.A. 1937, Princeton University; M.A. 1938, Ph.D. 1942, Harvard University

Joseph Coleman Dawson, *Assistant Professorial Lecturer in Journalism*
B.A. 1958, University of Detroit

Louis De Alessi, *Professor of Economics*
B.A. 1954, M.A. 1955, Ph.D. 1961, University of California, Los Angeles

Eugene Richard Declercq, *Visiting Assistant Professor of Political Science*
B.S. 1970, Lowell Technological Institute; M.B.A. 1971, University of Massachusetts; M.S. 197
Ph.D. 1974, Florida State University

Rosalie Frances De Giovanni-Donnelly, *Assistant Research Professor o*
Microbiology
B.A. 1947, M.A. 1953, City University of New York, Brooklyn College; Ph.D. 1961, Columbia
University

Gary Raymond DeLisle, *Adjunct Instructor in Health Care Administration*
B.Gen.Std. 1970, Rollins College; M.H.A. 1972, University of Michigan

Frank Landt Dennis, *Professorial Lecturer in Journalism*
B.A. 1929, University of Oklahoma; LL.B. 1935, Harvard University

Linda Grant DePauw, *Associate Professor of American History*
B.A. 1961, Swarthmore College; Ph.D. 1964, Johns Hopkins University

Milton Harold Desmond, *Professor of Zoology and of Forensic Sciences*
B.S. 1949, Hartwick College; M.S. 1951, Ph.D. 1954, Brown University

Mildred Thompson Deuel, *Adjunct Assistant Professor of French*
B.A. 1953, Bryn Mawr College; M.A. 1954, Middlebury College; Ph.D. 1965, New York University

Milton Charles Devolites, *Associate Professor of Health Care Administration*
B.A. 1938, Harvard University; M.A. 1953, Baylor University

Jessie Carleton Calver Dickens, *Associate Professorial Lecturer in Biological Sciences*
B.A. 1939, M.S. 1969, George Washington University

Antoinette LaVerne Dickerson, *Associate Research Professor of Human Kinetics and Leisure Studies*
B.S. 1958, Virginia State College; M.A. 1959, Ed.D. 1973, New York University

Paul McGregor Dickie, *Associate Professorial Lecturer in Business Administration*
B.A.Sc. 1961, University of British Columbia; M.B.A. 1966, D.B.A. 1968, University of Southern California

Joseph Amedeo Di Paolo, *Associate Professorial Lecturer in Anatomy*
B.A. 1948, Wesleyan University; M.S. 1949, Case Western Reserve University; Ph.D. 1951, Northwestern University

Frank Paul DiPerna, Jr., *Assistant Professorial Lecturer in Forensic Sciences*
B.S.M.E. 1970, Virginia Polytechnic Institute and State University

John Phillip Dirkse III, *Assistant Professor of Statistics*
B.S. 1969, University of Wisconsin-Oshkosh; M.S. 1971, Ph.D. 1973, Purdue University

Salvatore Frank Divita, *Associate Professor of Business Administration; Associate Dean for External Affairs, School of Government and Business Administration*
B.I.E. 1953, New York University; M.B.A. 1956, Ohio State University; D.B.A. 1968, Harvard University

Wallace Bruce Dobry, *Studio Lecturer in Applied Music (Piano and Organ)*
Mus.B. 1956, Peabody Institute of the City of Baltimore

Michael Francis Dolan, *Associate Professor of Pathology (Hematology)*
B.S. 1953, Manhattan College; M.D. 1957, New York Medical College

Jesse Frank Doubleday, *Professorial Lecturer in Business Administration*
B.S. 1954, University of Maryland; M.A. 1955, George Washington University

Allan Drexler, *Professorial Lecturer in Education*
B.S. 1950, Long Island University; M.S. 1952, Pennsylvania State University; Ph.D. 1958, Purdue University

Daniel Maccabaeus Dribin, *Professorial Lecturer in Mathematics*
B.S. 1933, M.S. 1934, Ph.D. 1936, University of Chicago

Irwin Dubinsky, *Assistant Professor of Public Administration*
B.A. 1963, City University of New York, Queens College; Ed.M. 1969, M.P.I.A. 1970, Ph.D. 1972, University of Pittsburgh

Jacqueline Hastings Dudley, *Assistant Professorial Lecturer in Speech*
B.A. 1948, University of Maryland; M.A. 1965, George Washington University

Mary Jean Benford Duff, *Assistant Professorial Lecturer in Education*
B.A. 1952, Louisiana Technological University; Ed.M. 1960, Louisiana State University and Agricultural and Mechanical College

Michael Sherman Duke, *Assistant Professor of Chinese*
B.A. 1962, University of California, Davis; M.A. 1969, University of California, Berkeley

Dorothy Duncan, *Assistant Professorial Lecturer in Human Kinetics Leisure Studies*
B.A. 1950, Brenau College; M.A. in Ed. 1969, George Washington University

Alfred Duncker, *Associate Professorial Lecturer in Health Care Administra*
B.A. 1961, Union College; Ph.D. 1971, Columbia University

Robert Martin Dunn, Jr., *Associate Professor of Economics*
B.A. 1960, Williams College; M.A. 1963, Ph.D. 1967, Stanford University

Bruce Baker Dunning, *Assistant Professorial Lecturer in Sociology*
B.A. 1965, George Washington University

Robert Frederick Dyer, *Assistant Professor of Business Administration*
B.S. in B.A. 1965, M.B.A. 1966, Bowling Green State University; D.B.A. 1972, Univers Maryland

George Curtis Eads, *Associate Professor of Economics*
B.A. 1964, University of Colorado; M.A. 1965, M.Phil. 1967, Ph.D. 1968, Yale University

Hazel Mary Eagle, *Lecturer in English*
M.A. 1955, University of Cambridge

Kenneth Martin Earle, *Professorial Lecturer in Neurology, in Neurolog Surgery, and in Forensic Sciences*
B.A. 1942, Rice University; M.D. 1945, University of Texas Medical Branch at Galveston; 1951, McGill University

Roy Brandon Eastin, *Professor of Business Administration*
B.A. 1943, M.A. 1945, George Washington University; Ph.D. 1953, American University

John Walter Eberhard, *Associate Professorial Lecturer in Human Ki and Leisure Studies*
B.S. 1955, St. Joseph's College, Pennsylvania; M.A. 1958, Ph.D. 1965, Fordham University

Gordon Stuart Edwards, *Assistant Professor of Pharmacology*
B.A. 1959, Amherst College; M.A. 1962, Harvard University; Sc.D. 1970, Massachusetts In of Technology

Julian Eisenstein, *Professor of Physics*
B.S. 1941, M.A. 1942, Ph.D. 1948, Harvard University

Rodney Eldridge, *Associate Professor of International Finance*
B.A. 1949, M.A. 1959, University of Vermont; Ph.D. 1966, Columbia University

Charles Fox Elliott, *Associate Professor of Political Science and Internati Affairs*
B.A. 1953, Ph.D. 1964, Harvard University; M.A. 1958, University of California, Berkeley

Lloyd Hartman Elliott, *Professor of Higher Education; President of University*
B.A. 1937, Glenville State College; M.A. 1939, LL.D. 1967, West Virginia University; 1948, University of Colorado; LL.D. 1963, University of New Hampshire; LL.D 1968 College; LL.D. 1966, Concord College; LL.D. 1969, University of Maine at Orono; LL.D Georgetown University

William Francis Enos, *Assistant Clinical Professor of Pathology*
B.A. 1942, Dartmouth College; M.D. 1945, State University of New York Downstate Me Center

Mary Frances Kelly Ericksen, *Special Lecturer in Anatomy*
B.A. 1947, Indiana University at Bloomington; M.A. 1957, Columbia University, Ph.D George Washington University

Richard Ferdinand Ericson, *Professor of Management*
B.A. 1943, M.B.A. 1948, University of Chicago; Ph.D. 1952, Indiana University at Bloo

Grace Elizabeth Orvis Evans, *Professorial Lecturer in Art*
B.A. 1943, M.A. 1946, University of Minnesota

Grose Evans, *Adjunct Associate Professor of Art*
B.F.A. 1939, M.A 1940, Ohio State University, Ph.D. 1953, Johns Hopkins University

Marilyn Jane Evans, *Associate Professorial Lecturer in Chinese*
B.A. 1958, Middlebury College; Ph.D. 1965, Yale University

Shawki Farag, *Professorial Lecturer in Accounting*
B.Com. 1960, Cairo University; M.S. 1963, Ph.D. 1967, University of Illinois at Urbana-Cha M.A. 1965, Yale University

Edward Jude Feeney, *Assistant Professorial Lecturer in Education*
B.A. 1951, St. Anselm's College; M.A. in Ed. 1958, Ed.D. 1971, George Washington University

Regis John Ferruzza, *Studio Lecturer in Applied Music (Guitar)*

*Nicolae Filipescu, *Professor of Chemistry*
Ph.D. 1957, University of Industrial Chemistry, Polytechnical Institute, Rumania; Ph.D. 1964, George Washington University

Dana Fischer, *Assistant Professor of Political Science and International Affairs*
B.A. 1965, Lewis and Clark College; M.A. 1968, Ph.D. 1973, University of Washington

Joseph Lyman Fisher, *Adjunct Professor of Economics*
B.S. 1935, Bowdoin College; M.A. 1938, Ph.D. 1947, Harvard University; M.A. in Ed. 1951, George Washington University

Stephen Todd Fisher, *Adjunct Instructor in Health Care Administration*
B.A. 1963, Washington and Jefferson College; M.B.A. 1965, Cornell University

Peter Harvey Fishman, *Lecturer in Biochemistry*
B.S. 1961, Massachusetts Institute of Technology; M.S. 1967, Ph.D. 1970, George Washington University

Charles Eugene Fisk, Jr., *Associate Professorial Lecturer in Management Science*
B.S. 1964, University of Pennsylvania; Ph.D. 1972, Rice University

William Gary Flamm, *Adjunct Professor of Genetics*
B.S. 1957, M.S. 1959, Ph.D. 1962, University of Cincinnati

Richard John Frankie, *Professor of Education*
B.A. 1952, M.A. 1955, University of Michigan; Ed.D. 1966, Wayne State University

Roderick Stuart French, *Associate Professor of Philosophy*
B.A. 1954, Kenyon College; B.D. 1957, Episcopal Theological School; M.S.T. 1965, Union Theological Seminary, Ph.D. 1971, George Washington University

John Andrew Frey, *Professor of Romance Languages*
B.A. 1951, M.A. 1952, University of Cincinnati; Ph.D. 1957, Catholic University of America

Thomas Baer Friedman, *Adjunct Assistant Professor of Genetics*
B.S. 1967, Ph.D. 1971, University of Michigan

Fred Frishman, *Associate Professorial Lecturer in Statistics*
B.B.A. 1947, City University of New York, City College; B.A. 1956, M.A. 1957, Ph.D. 1971, George Washington University

Richard Coe Froede, *Professorial Lecturer in Forensic Sciences*
B.A. 1951, Ripon College; M.D. 1955, Marquette University

William Edward Fuhrman, *Studio Lecturer in Applied Music (Flute)*
Mus.B. 1968, Catholic University of America

Stephen Souther Fuller, *Associate Professor of Urban Planning*
B.A. 1962, Rutgers University, New Brunswick; M.C.P. 1964, University of Mississippi; Ph.D. 1969, Cornell University

Maurice Bennett Furlong, Jr., *Assistant Clinical Professor of Pathology (Laboratory Medicine)*
B.A. 1964, Fordham University; M.D. 1968, Harvard University

Matthew Henry Fusillo, *Assistant Professor of Pathology (Laboratory Medicine)*
B.S. 1948, University of Maryland; M.S. 1957, George Washington University

Michael Graham Gallagher, *Associate Professor of Accounting*
B.A. in Govt. 1960, J.D. 1964, LL.M. 1971, George Washington University; C.P.A. 1965, State of Virginia

Linda Lou Gallo, *Assistant Professor of Biochemistry*
B.S. 1959, West Virginia University; M.S. 1963, Ph.D. 1969, George Washington University

Robert Charles Gallo, *Adjunct Professor of Genetics*
B.A. 1959, Providence College; M.D. 1963, Thomas Jefferson University

Robert Norton Ganz, Jr., *Professor of English*
B.A. 1949, M.A. 1951, Ph.D. 1959, Harvard University

Blanche Hatfield Gardner, *Lecturer in German*
B.A. 1940, Mount Holyoke College; M.A. 1942, University of Wisconsin-Madison

*On sabbatical leave fall semester 1975.

David John Gardner, *Assistant Clinical Professor of Psychiatry and Behavi*
Sciences
B.A. 1957, Atlantic Union College; M.D. 1961, Loma Linda University

Floris Melbourne Garner, *Assistant Clinical Professor of Pathology (Compa*
tive)
B.S. 1948, D.V.M. 1950, Washington State University

Nathan Conant Garner, *Assistant Professor of Drama; Acting Director*
Theatre
B.A. 1963, Tufts University; M.A. 1966, University of North Carolina at Chapel Hill

Joseph Lewis Gastwirth, *Professor of Statistics and Economics*
B.S. 1958, Yale University; M.A 1960, Princeton University; Ph.D. 1963, Columbia Uni

Harry Irving Gates, *Assistant Professor of Sculpture*
B.F.A. 1958, M.F.A. 1960, University of Illinois at Urbana-Champaign

James David Gates, *Assistant Professorial Lecturer in Education*
B.A. 1951, Hiram College; M.A. 1956, Columbia University

Aladino Gavazzi, *Associate Professorial Lecturer in Health Care Administrati*
B.S. 1953, M.S. 1955, Columbia University

Dolores Sans Geddes, *Professorial Lecturer in Human Kinetics and Leis*
Studies
B.S. 1965, University of Houston; M.A. 1967, Ed.D. 1972, University of Northern Colorado

Alfonso Geiger, *Associate Professorial Lecturer in Geology*
B.S. 1950, University of Michigan

Lyndale Harpster George, *Associate Professor of Human Kinetics and Leis*
Studies
B.S. in P.E. 1948, M.A. in Ed. 1952, A.P.C. 1961, George Washington University

Peter Thomas Geueke, *Special Lecturer in Pathology*

Howard Frank Gillette, Jr., *Assistant Professor of American Civilization*
B.A. 1964, Ph.D. 1970, Yale University

Leon Gintzig, *Professor of Hospital Administration*
B.S. 1947, Boston University; M.S. 1954, Northwestern University; Ph.D. 1958, Universi
Iowa

Edmund John Gleazer, Jr., *Professorial Lecturer in Education*
B.A. 1938, University of California, Los Angeles; Ed.M. 1943, Temple University; Ed.D
Harvard University

Irving Isadore Glick, *Associate Professor of Mathematics*
B.A. 1953, Johns Hopkins University; Ph.D. 1961, University of Maryland

Ira David Godwin, *Assistant Clinical Professor of Pathology*
B.S. 1952, M.D. 1955, University of North Carolina at Chapel Hill

Leo Robert Goldbaum, *Associate Professorial Lecturer in Forensic Sciences*
B.S. 1934, City University of New York, Brooklyn College; M.S. 1938, New York Univ
Ph.D. 1950, George Washington University

Robert Stanley Goldfarb, *Associate Professor of Economics*
B.A. 1964, Columbia University; M.A. 1965, M.Phil. 1967, Ph.D. 1968, Yale University

*Victor Karl Golla, *Associate Professor of Anthropology*
B.A. 1960, Ph.D. 1970, University of California, Berkeley

Robert Golten, *Assistant Professorial Lecturer in Forensic Sciences*
B.A. 1954, University of Michigan; LL.B. 1959, Harvard University

Marvin Gordon, *Professor of Geography and Regional Science*
B.A. 1942, City University of New York, City College; M.A. 1954, Ph.D. 1966, Columbia U

Charles Mayo Goss, *Visiting Professor of Anatomy (Medical History)*
B.A. 1921, M.D. 1926, Yale University

Fern Alvin Goss, *Assistant Professorial Lecturer in Education*
B.S. in Ed. 1958, Bloomsburg State College; Ed.M. 1964, State University of New Yo
Buffalo; Ed.D. 1970, George Washington University

---

* On sabbatical leave fall semester 1975.

Edward Gramlich, *Adjunct Associate Professor of Economics*
B.A. 1961, Williams College; M.A. 1962, Ph.D. 1965, Yale University

Steven Alan Grant, *Assistant Professor of Russian History and International Affairs*
B.A. 1966, Pomona College; Ph.D. 1973, Harvard University

Marvin David Green, *Associate Professor of Mathematics*
B.S. 1961, M.A. 1962, Ph.D. 1965, University of Cincinnati

William James Green, Jr., *Adjunct Assistant Professor of Health Care Administration*
B.A. 1958, Georgetown University; M.H.A. 1962, University of Minnesota

Joseph Arthur Greenberg, *Assistant Professor of Education*
B.S. in Bus.Ed. 1966, Salem State College; Ed.M. 1968, Ed.D. 1974, Boston University

Sherwin Greene, *Associate Professor of Urban Planning*
B.Arch. 1959, M.S. in C.R.P. 1960, Illinois Institute of Technology

Samuel Greenhouse, *Professor of Statistics*
B.S. 1938, City University of New York, City College; M.A. 1954, Ph.D. 1959, George Washington University

Fuller Griffith, *Assistant Professor of Graphics*
B.S. 1952, University of Wisconsin-Madison; M.F.A. 1969, George Washington University

William Byron Griffith, *Associate Professor of Philosophy*
B.A. 1958, University of Notre Dame; M.A. 1962, Ph.D. 1963, Yale University

Margaret Spencer Grotte, *Assistant Professorial Lecturer in English*
B.A. 1969, Brandeis University; M.A. 1972, Ph.D. 1974, Cornell University

Phillip Donald Grub, *Aryamehr Professor of Multinational Management; Assistant to the President for International Affairs*
B.A., B.A. in Ed. 1953, Eastern Washington State College; M.B.A. 1960, D.B.A. 1964, George Washington University

Francis Stanley Grubar, *Professor of Art*
B.A. 1948, M.A. 1949, University of Maryland; M.A. 1952, Ph.D. 1966, Johns Hopkins University

Joseph Grunwald, *Adjunct Professor of Economics*
B.S. 1943, Johns Hopkins University; Ph.D. 1950, Columbia University

John Gregory Guccion, *Assistant Professor of Pathology*
B.A. 1958, John Carroll University; M.D. 1962, Georgetown University

Margaret Beltz Guenther, *Assistant Professorial Lecturer in German*
B.A. 1950, M.A. 1953, University of Kansas; Ph.D. 1958, Radcliffe College

Roy James Guenther, *Assistant Professorial Lecturer in Music*
B. Mus. Ed. 1966, B.M. 1968, University of Kansas; M.A. 1974, Catholic University of America

Grace Hughes Guin, *Associate Clinical Professor of Pathology*
B.S. 1938, Birmingham-Southern College; M.D. 1943, Vanderbilt University

Gordon Guroff, *Professorial Lecturer in Biochemistry*
B.S. 1954, University of Illinois at Urbana-Champaign; M.S. 1956, Auburn University; Ph.D. 1959, University of Wisconsin—Madison

William Henry Guy, *Assistant Research Professor of Health Care Administration*
B.A. 1947, Northeastern University; M.A. 1948, Boston University; Ph.D. 1967, George Washington University

Andrew Gyorgy, *Professor of International Affairs and Political Science*
B.A. 1937, J.D. 1938, University of Budapest; M.A. 1939, University of California, Berkeley; Ph.D. 1943, University of California, Los Angeles

Sheldon Edward Haber, *Associate Professor of Economics*
B.A. 1954, City University of New York, City College; Ph.D. 1958, Johns Hopkins University

Eleanor Martha Hadley, *Professorial Lecturer in Economics*
B.A. 1938, Mills College; M.A. 1943, Ph.D. 1949, Harvard University

Neil Blaine Hadley, *Assistant Professorial Lecturer in Health Care Administration*
B.A. 1949, University of Northern Iowa; M.H.A. 1958, Baylor University; M.S. 1962, Arizona State University; D.B.A. 1971, George Washington University

Robert Arthur Hadley, *Associate Professor of History*
B.A. 1959, Bowdoin College; M.A. 1960, Ph.D. 1964, University of Pennsylvania

Abraham Halpern, *Professorial Lecturer in International Affairs*
B.A. 1933, Harvard University; Ph.D. 1947, University of Chicago

Suzanne Dorothy Schubert Hammersberg, *Assistant Professor of Pathol (Medical Technology)*
B.S. 1957, University of Wisconsin—La Crosse

John James Hampton, *Associate Professor of Business Administration*
B.A. 1964, Stetson University; M.B.A. 1969, D.B.A. 1971, George Washington University

William Ambrose Hamrick, *Professorial Lecturer in Health Care Adminis tion*
B.S. 1934, Oklahoma State University; M.A. 1950, American University; M.H.A. 1956, Ba University; D.S.O. 1969, Illinois College of Optometry

Raymond George Hanken, *Professor of Human Kinetics and Leisure Studies*
B.S. in P.E. 1938, M.A. in Ed. 1952, George Washington University

Margie Rosann Hanson, *Professorial Lecturer in Human Kinetics and Leis Studies*
B.S. 1943, University of Minnesota; M.S. 1946, University of California, Los Angeles; Ph.D. 19 University of Washington

Norman Ross Harbaugh, *Assistant Professorial Lecturer in Business Administration*
B.S. 1950, Columbia University; M.A. 1951, Stanford University; M.B.A. 1955, D.B.A. 1965, Harvard University

Harold Cecil Harder, *Assistant Professor of Pharmacology*
B.S. 1964, Alma College, Michigan; M.S. 1966, Ph.D. 1970, Michigan State University

William Walter Hardgrave, *Associate Professor of Management Science*
B.A. 1959, Princeton University; D.Engr. 1962, Johns Hopkins University

John Hardt, *Professorial Lecturer in Economics*
B.A. 1945, M.A. 1948, University of Washington; M.A. 1950, Ph.D. 1955, Columbia Univer

Michael Mont Harmon, *Associate Professor of Public Administration*
B.A. 1963, Utah State University; M.P.A. 1966, Ph.D. 1968, University of Southern Califor

Clarence Richard Hartman, *Associate Professor of Epidemiology and E vironmental Health*
B.A. 1933, M.D. 1936, George Washington University

Jerry Harvey, *Associate Professor of Management Science*
B.B.A. 1957, Ph.D. 1963, University of Texas at Austin

Richard Catlin Haskett, *Professor of American History*
B.A. 1940, M.A. 1941, Indiana University at Bloomington; M.A. 1948, Ph.D. 1952, Prin University

Donald Hawkins, *Research Professor of Human Kinetics and Leisure Stud*
B.A. 1958, King's College, Pennsylvania; M.A. 1960, Lehigh University; Ed.D. 1967, New Y University

Charles Herbert Hayes, *Adjunct Instructor in Health Care Administration*
B.A. 1972, Chapman College; M.S. 1973, U.S. Naval Postgraduate School

Joseph Ernest Hazel, *Associate Professorial Lecturer in Geology*
B.A. 1956, M.A. 1960, University of Missouri—Columbia; Ph.D. 1963, Louisiana State Univer and Agricultural and Mechanical College

Janet Craig Heddesheimer, *Assistant Professor of Education*
B.A. 1965, Coe College; M.A. 1968, Ph.D. 1971, Ohio State University

Dorothy Henderson Heilman, *Professorial Lecturer in Microbiology (Cli Immunology)*
B.S. 1927, M.D. 1932, Northwestern University; M.S. 1940, University of Minnesota

Charles Heise, *Lecturer in English*
B.A. 1967, Edinboro State College

Elson Bowman Helwig, *Clinical Professor of Pathology (Dermatologic)*
B.S. 1930, Indiana University at Bloomington; M.D. 1932, Indiana University at Indianapolis

David Carleton Hendrix, *Clinical Instructor in Pathology (Allied Health Science)*
B.S. in Engr. 1970, University of Michigan

Dagmar Renate Kirshner Henney, *Associate Professor of Mathematics*
B.S. 1954, M.S. 1956, University of Miami; Ph.D. 1964, University of Maryland

Charles Stuart Henry, *Assistant Professor of Biology*
B.A. 1968, Ph.D. 1973, Harvard University

Charles Joseph Herber, *Associate Professor of European History*
B.A. 1952, Dickinson College; M.A. 1957, Ph.D. 1965, University of California, Berkeley

Leo Herbert, *Professorial Lecturer in Accounting*
B.S. 1939, Brigham Young University; M.B.A. 1941, Ph.D. 1944, Louisiana State University and Agricultural and Mechanical College

Gilbert Herer, *Professorial Lecturer in Speech*
B.S. 1953, M.S. 1954, Syracuse University; Ph.D. 1964, Northwestern University

Roy Hertz, *Research Professor of Pharmacology and of Obstetrics and Gynecology*
B.A. 1930, Ph.D. 1933, M.D. 1939, University of Wisconsin—Madison; M.P.H. 1940, Johns Hopkins University

Susan Hertz, *Assistant Professorial Lecturer in Anthropology*
B.A. 1968, Stanford University; M.A. 1969, Ph.D. 1974, University of Minnesota

Robert William Hertzog, *Associate Professorial Lecturer in Forensic Sciences*
B.S. 1963, Morgan State College; M.D. 1967, University of Maryland

Helen Hope Hess, *Professor of Neurology and of Biochemistry*
B.A. 1946, B.S. 1948, West Virginia University; M.D. 1951, Harvard University

Carla Susan Raskin Heymsfeld, *Assistant Professorial Lecturer in Education*
B.A. 1962, Brandeis University; M.A. in Ed. 1967, George Washington University

Jocelyn Muriel B. Hicks, *Assistant Professor of Child Health and Development and of Pathology*
B.S. 1959, M.S. 1962, University of London; Ph.D. 1971, Georgetown University

Julia Elizabeth Hicks, *Assistant Professor of Spanish*
B.A. 1946, M.A. 1947, University of Tennessee, Knoxville

Philip Henry Highfill, Jr., *Professor of English*
B.A. 1942, Wake Forest University; M.A. 1948, Ph.D. 1950, University of North Carolina at Chapel Hill

*Peter Proal Hill, *Professor of History*
B.A. 1949, Tufts University; M.A. 1954, Boston University; Ph.D. 1966, George Washington University

James William Hillis, *Professor of Speech; Director, Speech Pathology and Audiology*
B.S. 1952, University of Nebraska; M.A. 1957, University of Maryland; Ph.D. 1963, Ohio State University

William Albert Hillman, Jr., *Assistant Professorial Lecturer in Human Kinetics and Leisure Studies*
B.S. 1952, East Stroudsburg State College; M.S. 1962, University of Idaho

Joseph Hilmy, *Professorial Lecturer in Accounting*
B.Com. 1947, M.S. 1954, Ph.D. 1959, University of Aberdeen

Alfred John Hiltebeitel, *Associate Professor of Religion*
B.A. 1963, Haverford College; M.A. 1966, Ph.D. 1973, University of Chicago

Robert Bruce Hinds, *Adjunct Instructor in Health Care Administration*
B.A. 1966, George Washington University; M.S. 1967, U.S. Naval Postgraduate School

Harold Clendenin Hinton, *Professor of Political Science and International Affairs*
B.A. 1946, M.A. 1948, Ph.D. 1951, Harvard University

Harold Lester Hirsh, *Professorial Lecturer in Health Care Administration*
M.D. 1942, Georgetown University

*On sabbatical leave academic year 1975-76

Herman Hedberg Hobbs, *Professor of Physics*
B.S. 1953, M.S. 1955, George Washington University; Ph.D. 1958, University of Virginia

Cornelia Hoch-Ligeti, *Clinical Professor of Pathology*
M.D. 1931, University of Vienna

Edward Eugene Hogg, *Special Lecturer in Pathology*

Robert Lee Holland, *Associate Professor of Management Science; Dean the College of General Studies*
B.S. 1951, M.S. 1956, University of Tennessee, Knoxville; Ph.D. 1960, Texas A&M Univer

Mary Alida Holman, *Professor of Economics*
B.A. 1955, M.A. 1957, Ph.D. 1963, George Washington University

Robert William Holmstrom, *Associate Professor of Psychology*
B.A. 1956, Trinity College, Connecticut; Ph.D. 1965, Duke University

Harold Romo Holzman, *Assistant Professorial Lecturer in Forensic Sciences*
B.A. 1966, State University of New York at Stony Brook; M.A. 1968, University of Mary

William Duane Hope, *Adjunct Associate Professor of Biological Sciences*
B.S. 1957, M.S. 1960, Colorado State University; Ph.D. 1964, University of California D

Grace Brewster Murray Hopper, *Professorial Lecturer in Management Science*
B.A. 1928, Vassar College; M.A. 1930, Ph.D. 1934, Yale University

Gloria Lyon Horrworth, *Associate Professor of Education*
B.A. 1952, California State University, Los Angeles; M.A. 1961, California State Univers
Northridge; Ed.D. 1972, American University

Sue Ann Robinson Hoth, *Research Instructor in Education*
B.A. 1968, University of New Hampshire, M.A. 1971, Columbia University

Nicholas Hotton, *Professorial Lecturer in Geology*
B.S. 1947, Ph.D. 1950, University of Chicago

John Candee Houck, *Professor of Child Health and Development (Biochemistry)*
B.A. 1953, Columbia University; M.S. 1955, Ph.D. 1956, University of Western Ontario

Dee Ann Pletsch Houston, *Assistant Professorial Lecturer in Biologi Sciences*
B.S. 1965, M.S. 1966, George Washington University

Lawrence Houstoun, Jr., *Assistant Professorial Lecturer in Human Kineti and Leisure Studies*
B.A. 1952, Lafayette College

Paul Michael Horvitz, *Visiting Professor of Finance*
B.A. 1954, University of Chicago; M.B.A. 1956, Boston University; Ph.D. 1958, Massachus
Institute of Technology

James Weldon Howell, *Assistant Clinical Professor of Pathology (Clini Chemistry)*
B.S. 1957, Hardin-Simmons University; M.D. 1962, University of Texas Southwestern Me
School at Dallas

R. Pamela Hoyle, *Visiting Assistant Professor of Art*
B.A. 1969, M.A. 1971, University of North Carolina at Chapel Hill

Tao-tai Hsia, *Professorial Lecturer in Law*
LL.B. 1945, National Cheng-chih University, China; LL.M. 1950, J.S.D. 1952, Yale Univers

Ching-Yao Hsieh, *Professor of Economics*
B.A. 1939, St. John's University, China; M.A. 1958, Ph.D. 1964, George Washington Univer

Kun-yen Huang, *Associate Professor of Microbiology*
M.D. 1959, National Taiwan University; Ph.D. 1967, George Washington University

Terry Lee Hufford, *Assistant Professor of Botany*
B.S. 1961, M.A. 1962, Bowling Green State University; Ph.D. 1972, Ohio State University

Rudolph Hugh, *Professor of Microbiology*
B.S. 1948, Michigan State University; Ph.D. 1954, Loyola University of Chicago

Roger Dale Hughes, *Clinical Instructor in Pathology*
B.S. 1966, East Tennessee State University

Thomas Louis Hughes, *Assistant Professorial Lecturer in Geology*
B.S. 1958, University of Oklahoma

Robert Lee Humphrey, Jr., *Associate Professor of Anthropology*
B.A. 1962, American University; Ph.D. 1970, University of New Mexico

***Gérard Paul Huvé,** *Assistant Professor of French*
B.A. 1963, American University; M.A. 1969, University of Maryland

James Francis Clark Hyde, Jr., *Associate Professorial Lecturer in Political Science*
B.S. 1942, U.S. Military Academy; LL.B. 1949, University of Pennsylvania; M.A. in I.A. 1967, George Washington University

†C. Terrence Ireland, *Associate Professor of Statistics*
B.A. 1960, Cornell University; Ph.D. 1967, George Washington University

Nelson Sumner Irey, *Clinical Professor of Pathology*
B.S. 1935, M.D. 1938, University of Pittsburgh

Norman Murray Irvine, *Studio Lecturer in Applied Music (Bass)*
B.S. in Mus.Ed. 1955, M.Ed. in Mus.Ed. 1962, University of Maryland

Rita Joy Klein Ives, *Associate Professor of Special Education*
B.S. 1953, University of Pittsburgh; M.A. in Ed. 1957, Ed.S. 1967, Ed.D. 1971, George Washington University

David Iwamoto, *Associate Professorial Lecturer in Education*
B.A. 1947, Walla Walla College; M.A. 1948, Columbia Union College; M.A. in Ed. 1952, Ed.D. 1963, George Washington University

Michael John Jackson, *Associate Professor of Physiology and Associate Research Professor of Medicine*
B.S. 1963, University of London; Ph.D. 1966, Sheffield University

Cecil Bryant Jacobson, *Assistant Professor of Obstetrics and Gynecology*
B.S. 1960, University of Utah; M.D. 1964, George Washington University

Louis Sidney Jaffe, *Associate Clinical Professor of Epidemiology and Environmental Health*
B.S. 1933, City University of New York, Brooklyn College; M.A. 1934, Columbia University

William James Jaffurs, *Associate Clinical Professor of Pathology*
B.S. 1948, Pennsylvania State University; M.D. 1952, Thomas Jefferson University

Frank Skiff Jannotta, *Associate Professor of Pathology*
B.A. 1951, Williams College; M.D. 1955, University of Pennsylvania

Dorothy Coy Jarvinen, *Studio Lecturer in Applied Music (Cello)*
Diploma 1939, Institute of Musical Art

Juri Jelagin, *Associate Professorial Lecturer in Russian*
Mus.M. 1939, Moscow State Conservatory

John Felix Jemionek, *Assistant Professorial Lecturer in Chemistry*
B.S. 1968, Villanova University; Ph.D. 1972, University of Pittsburgh

Alvin Carl Jensen, *Associate Professorial Lecturer in Education*
Ed.B. 1958, University of Wisconsin–Whitewater; M.A. in Ed. 1960, Ed.D. 1967, George Washington University

‡Joe Lee Jessup, *Professor of Business Administration*
B.S. in B.A. 1936, University of Alabama; M.B.A. 1941, Harvard University; LL.D. 1964, University of Chungang, Korea

Eva Mayne Johnson, *Professor of Psychology*
B.A. 1949, M.A. 1951, Ph.D. 1957, George Washington University

Frank Bacchus Johnson, *Associate Professorial Lecturer in Forensic Sciences and Associate Clinical Professor of Pathology*
B.S. 1940, University of Michigan; M.D. 1944, Howard University

Harold Hunt Johnson, *Visiting Associate Professor of Mathematics*
B.A. 1951, California State University at San Jose; M.A. 1956, Ph.D. 1957, University of California, Berkeley

---

* On sabbatical leave spring semester 1976.
† On sabbatical leave fall semester 1975.
‡ On leave of absence academic year 1975-76.

Jay Sewell Johnson, *Assistant Professorial Lecturer in Forensic Sciences*
B.A. 1965, University of Michigan; J.D. 1968, Stanford University; M. Forens.S. 1974, Washington University

Lent Clifton Johnson, *Special Lecturer in Pathology*
B.S. 1931, M.D. 1935, University of Chicago

*Nancy Diers Johnson, *Assistant Professor of Human Kinetics and Leisure Studies*
B.S. 1955, University of Minnesota; M.A. 1966, University of Iowa

Thomas Nick Johnson, *Professor of Anatomy*
B.S. 1944, St. Ambrose College; M.S. 1949, Michigan State University; Ph.D. 1953, University of Michigan

William Arthur Johnson, *Research Professor of Economics*
B.A. 1958, Syracuse University; M.A. 1961, Ph.D. 1964, Harvard University

William Reid Johnson, *Associate Professor of History*
B.A. 1951, Oberlin College; M.A. 1955, Ph.D. 1961, University of Washington

Meredith Leam Jones, *Adjunct Professor of Biological Sciences*
B.A. 1948, M.A. 1952, Ph.D. 1956, University of California, Berkeley

†Robert Gean Jones, *Professor of Religion; University Marshal*
B.A. 1947, Baylor University; B.D. 1950, M.A. 1957, Ph.D. 1959, Yale University

Eva Scheyer Jospe, *Associate Professorial Lecturer in Religion*
M.A. 1963, Georgetown University

Hugo Dietrich Junghenn, *Assistant Professor of Mathematics*
B.S. 1964, Albright College; M.A. 1967, Villanova University; Ph.D. 1971, George Washington University

Robert Konrad Kahn, *Professorial Lecturer in Psychology*
B.A. 1946, University of Pennsylvania; M.A. 1953, George Washington University; Ph.D. Pennsylvania State University

Rochelle Krugman Kainer, *Associate Clinical Professor of Psychology*
B.S. 1957, Cornell University; M.A. 1958, New York University; Ph.D. 1965, Columbia University

Alan Kaplan, *Professorial Lecturer in Law and Forensic Sciences*
B.A. 1951, LL.M. 1957, New York University; LL.B. 1954, Harvard University

Stephen Arnold Karp, *Associate Professor of Psychology*
B.A. 1949, City University of New York, Brooklyn College; M.A. 1952, New School for Social Research; Ph.D. 1962, New York University

Kenneth Casper Kates, *Professorial Lecturer in Zoology*
B.A. 1932, Bard College; M.A. 1934, Ph.D. 1937, Duke University

Barbara Sylvia Katz, *Assistant Professorial Lecturer in Human Kinetics and Leisure Studies*
B.S. in P.E. 1952, City University of New York, Brooklyn College; M.A. in Ed. 1968, George Washington University

Irving Katz, *Associate Professor of Mathematics*
B.S. 1956, City University of New York, Brooklyn College; M.A. 1958, Ohio State University; Ph.D. 1964, University of Maryland

Leonard William Katz, *Associate Professorial Lecturer in Health Care Administration*
B.A. 1960, M.B.A. 1961, Dartmouth College; D.B.A. 1972, George Washington University

Erle Galen Kauffman, *Adjunct Professor of Geology*
B.S. 1955, M.S. 1956, Ph.D. 1961, University of Michigan

Samuel Kavruck, *Associate Professorial Lecturer in Education*
B.S. 1937, M.S. in Ed. 1939, City University of New York, City College; M.A. in Govt. Ed.D. 1954, George Washington University

Thomas Francis Kelleher, Jr., *Associate Professorial Lecturer in Forensic Sciences*
B.S. 1950, Fordham University

John Whitefield Kendrick, *Professor of Economics*
B.A. 1937, M.A. 1939, University of North Carolina at Chapel Hill; Ph.D. 1955, George Washington University

---

* On sabbatical leave academic year 1975-76.

Robert Emmet Kennedy, Jr., *Assistant Professor of European History*
B.A. 1963, Johns Hopkins University; M.A. 1965, Boston College; Ph.D. 1973, Brandeis University

Richard Alec Kenney, *Professor of Physiology*
B.S. 1945, Ph.D. 1947, University of Birmingham

Patrick Kennicott, *Associate Professorial Lecturer in Speech*
B.S. 1962, M.S. 1965, Ph.D. 1967, Florida State University; B.D. 1964, New Orleans Baptist Theological Seminary

*†**Robert Wayne Kenny,** *Professor of History*
B.J. 1953, University of Texas at Austin; M.A. 1957, University of Minnesota; Ph.D. 1963, University of Chicago

Stephen Gabriel Kent, *Associate Professor of Pathology*
B.A. 1956, M.D. 1960, Case Western Reserve University

Hewitt Kenyon, *Professor of Mathematics*
B.S. 1942, Ph.D. 1954, University of California, Berkeley

Jackson Kelley Kern, *Adjunct Assistant Professor of Statistics*
B.A. 1938, Fairmont State College; M.B.A. 1954, Columbia University

James Michael Kerns, *Assistant Professor of Anatomy*
B.A. 1966, St. Olaf College; M.S. 1968, Ph.D. 1972, Purdue University

Norayr Krikor Khatcheressian, *Assistant Professor of Physics*
B.A. 1960, M.A. 1963, George Washington University, Ph.D. 1966, University of Virginia

Sami Khoury, *Associate Professorial Lecturer in Health Care Administration*
M.D. 1950, Damascus University; M.P.H. 1970, Johns Hopkins University

Charles Lewis Killion, *Assistant Professorial Lecturer in Forensic Sciences*
B.S. in M.E. 1948, Purdue University

Sura Kang Kim, *Studio Lecturer in Applied Music (Piano)*
B.A. 1949, Ewha University, Korea; Mus.B. 1950, Baldwin-Wallace College; Mus.M. 1952, Manhattan School of Music

*†**Young Kim,** *Associate Professor of Political Science and International Affairs*
M.A. 1956, Vanderbilt University; Ph.D. 1958, University of Pennsylvania

Phyllis Dawn Kind, *Associate Professor of Microbiology*
B.A. 1955, Montana State University; M.S. 1956, Ph.D. 1960, University of Michigan

James Cecil King, *Professor of German*
B.A. 1949, M.A. 1950, Ph.D. 1954, George Washington University

Michael King, *Assistant Professor of Chemistry*
B.S. 1966, Illinois Institute of Technology; M.A. 1967, Ph.D. 1970 Harvard University

Virginia Randolph Kirkbride, *Professor of Educational Psychology*
B.A. 1941, M.A. 1942, University of Nebraska; Ed.D. 1959, George Washington University

Arthur David Kirsch, *Professor of Statistics and of Psychology*
B.A. 1955, George Washington University; M.S. 1956, Ph.D. 1957, Purdue University

Peter Flindell Klarén, *Associate Professor of History*
B.A. 1960, Dartmouth College; M.A. 1964, Ph.D. 1968, University of California, Los Angeles

Devra Gail Kleiman, *Adjunct Associate Professor of Psychology*
B.S. 1964, University of Chicago; Ph.D. 1969, University of London

Norman Klein, *Professorial Lecturer in Urban and Regional Planning*
B.B.A. 1942, City University of New York, City College; B.Arch. 1949, Massachusetts Institute of Technology

*†**Philip Klubes,** *Associate Professor of Pharmacology*
B.S. 1956, City University of New York, Queens College; M.S. 1959, Ph.D. 1962, University of Minnesota

Robert Earle Knowlton, *Associate Professor of Biology*
B.A. 1960, Bowdoin College; Ph.D. 1970, University of North Carolina at Chapel Hill

Marilyn Jean Koering, *Associate Professor of Anatomy*
B.A. 1960, College of St. Scholastica; M.S. 1963, Ph.D. 1967, University of Wisconsin—Madison

Louis Sampson Kornicker, *Adjunct Professor of Biological Sciences*
B.S. 1941, B.S. 1942, University of Alabama; M.A. 1954, Ph.D. 1957, Columbia University

* On sabbatical leave academic year 1975-76
† On sabbatical leave spring semester 1976.

Frank William Kovacs, *Professorial Lecturer in Education*
B.S. in P.E. 1956, M.A. in Ed. 1961, George Washington University

Robert Henry Kraft, *Studio Lecturer in Applied Music (Trombone and Recorder)*
Mus.B. 1960, Eastman School of Music

Edith Kramer, *Assistant Professorial Lecturer in Art Therapy*

Kenneth Krell, *Adjunct Assistant Professor of Genetics*
B.A. 1954, University of Pittsburgh; M.S. 1967, Ph.D. 1970, Columbia University

Dean Krueger, *Research Professor of Statistics and of Ophthalmology*
B.A. 1938, M.A. 1942, University of Chicago; M.S. 1959, Columbia University

Ruth Marilyn Krulfeld, *Associate Professor of Anthropology*
B.A. 1956, Brandeis University; Ph.D. 1974, Yale University

Richard John Kubalak, *Assistant Professorial Lecturer in Education*
B.S. in Ed. 1951, State University of New York at Buffalo; M.A. 1953, Columbia University

James Allan Kuhagen, *Assistant Research Professor of Education*
B.A. 1967, Augustana College, Illinois; Ed.M. 1968, Pennsylvania State University; Ph.D. 19[illegible] University of Wisconsin—Madison

Edwin Paul Kulawiec, *Associate Professor of Education*
B.S. 1950, Bethany College, West Virginia; M.A. 1956, Seton Hall University; M.A.T. 19[illegible] Indiana University at Bloomington; Ph.D. 1971, University of Wisconsin—Madison

Frederick Charles Kurtz, *Associate Professor of Accounting*
B.S. in Com. 1948, University of Virginia; M.B.A. 1949, University of Pennsylvania; C.P.A. 19[illegible] State of Maryland

Hanna Yaxa Landsberg Kwiatkowska, *Adjunct Assistant Professor of Art Therapy*
B.A. 1929, Academy of Fine Arts, Warsaw

John Marion Lachin III, *Assistant Research Professor of Statistics*
B.S. 1965, Tulane University of Louisiana; Sc.D. 1972, University of Pittsburgh

Mildred Pollack Lachman, *Assistant Professorial Lecturer in Art Therapy*
B.A. 1942, University of Pennsylvania; Ed.M. 1972, American University

Charles Laidlaw, *Professorial Lecturer in Management Science*
B.A. 1952, Colgate University; M.A. 1953, Yale University; M.C.P. 1966, Ph.D. 1968, Univers[illegible] of Pennsylvania

Jerry Lee Lake, *Assistant Professor of Photography*
B.F.A. 1966, Virginia Commonwealth University; M.F.A. 1968, Ohio University

Walter James Landen, *Adjunct Assistant Professor of Health Care Administration*
B.S. in B.A. 1962, J.D. 1965, University of Denver; LL.M. 1970, George Washington Univers[illegible]

Joan Simon Landy, *Instructor in Special Education*
B.S. in Elem.Ed. 1968, Syracuse University; M.A. in Ed. 1969, George Washington Univers[illegible]

Carl James Lange, *Associate Professor of Psychology; Assistant Vice Presid[illegible] for Research*
B.S. 1945, Duke University; M.S. 1948, Ph.D. 1951, University of Pittsburgh

Leroy Lester Langley, *Special Lecturer in Physiology*
B.A. 1938, University of California, Los Angeles; M.A. 1939, Stanford University; Ph.D. [illegible] Yale University; LL.B. 1954, Birmingham Law School

Kenneth Joseph Langran, *Assistant Professor of Geography and Regi[illegible] Science*
B.A. 1963, California State University, Long Beach; M.A. 1968, University of Washington

Geza Peter Lauter, *Professor of Business Administration*
B.A. 1954, Institute for Foreign Languages, Hungary; B.A. 1962, M.B.A. 1964, Ph.D. [illegible] University of California, Los Angeles

Robert Alan Lavine, *Associate Professor of Physiology*
B.S. 1962, Ph.D. 1969, University of Chicago

Thelma Z. Lavine, *Elton Professor of Philosophy*
B.A. 1936, Radcliffe College; M.A. 1937, Ph.D. 1939, Harvard University

Thomas Lawton, *Associate Professorial Lecturer in Chinese*
B.S. 1953, Durfee Technical Institute; M.F.A. 1959, University of Iowa; Ph.D. 1970, Harvard University

William Matthew Leach, *Adjunct Professor of Genetics*
B.A. 1956, Berea College; M.S. 1962, Ph.D. 1965, University of Tennessee, Knoxville

Hugh Linus LeBlanc, *Professor of Political Science and Public Affairs; Director, Programs in Public Affairs*
B.A. 1948, Louisiana State University and Agricultural and Mechanical College; M.A. 1950, University of Tennessee, Knoxville; Ph.D. 1958, University of Chicago

Davis Lin-chuan Lee, *Assistant Professor of Chinese*
B.S. 1955, Chung-Hsing University, Taiwan; M.S. 1959, University of Minnesota

*Myrna Pike Lee, *Associate Professor of Mathematics*
B.A. 1957, Cornell University; M.S. 1959, Ph.D. 1962, University of Illinois

Donald Richard Lehman, *Assistant Professor of Physics*
B.A. 1962, Rutgers University, New Brunswick; M.S. 1964, U.S. Air Force Institute of Technloogy; Ph.D. 1970, George Washington University

Elyse Brauch Lehman, *Adjunct Assistant Professor of Psychology*
B.A. 1962, Rutgers University, New Brunswick; M.A. 1967, Ph.D. 1970, George Washington University

Patricia Hilary Madoo Lengermann, *Associate Professor of Sociology*
B.A. 1963, University of Oxford; M.A. 1966, Ph.D. 1969, Cornell University

Fred Charles Leone, *Professorial Lecturer in Statistics*
B.A. 1942, Manhattan College; M.S. 1943, Georgetown University; Ph.D. 1949, Purdue University

Edwin Milton Lerner II, *Research Professor of Microbiology*
B.A. 1941, M.D. 1944, Harvard University

Lawrence Stephen Lessin, *Professor of Medicine and of Pathology*
M.D. 1962, University of Chicago

Ian Leverton, *Adjunct Assistant Professor of Anatomy*
M.B., B.S. 1970, University of London; M.R.C.S., L.R.C.P. 1970, Royal College of Physicians, England

Louis Levine, *Professorial Lecturer in Business Economics*
B.A. 1929, M.A. 1930, Ph.D. 1934, Ohio State University

Steven Levisohn, *Professorial Lecturer in Biochemistry*
B.A. 1962, M.D. 1966, Harvard University

Sar Levitan, *Professor of Economics*
B.S.S. 1937, City University of New York, City College; M.A. 1939, Ph.D. 1949, Columbia University

Bernard Isaac Levy, *Professor of Psychology*
B.A. 1948, New York University; Ph.D. 1952, University of Rochester

Joseph Benjamin Levy, *Professor of Chemistry*
B.S. 1943, University of New Hampshire; M.S. 1945, Ph.D. 1948, Harvard University

Edwin Joseph Baughman Lewis, *Professor of Accounting*
B.A. 1938, University of Western Ontario; M.B.A. 1939, Northwestern University

John Frederick Lewis, *Associate Professor of Geology*
B.S. 1959, M.S. 1960, Victoria University of Wellington, New Zealand; D.Phil. (Oxon.) 1964, University of Oxford

Ralph Kepler Lewis, *Professor of Anthropology*
B.A. 1934, Southwest Missouri State College; M.A. 1939, University of Southern California; Ph.D. 1967, Columbia University

Hubert Whitman Lilliefors, *Professor of Statistics*
B.A. 1952, Ph.D. 1964, George Washington University; M.A. 1953, Michigan State University

Carl Arne Linden, *Associate Professor of International Affairs and Political Science*
B.A. 1951, Syracuse University; M.A. 1956, Harvard University; Ph.D. 1966, George Washington University

Roy Charles Lindholm, *Associate Professor of Geology*
B.S. 1959, University of Michigan; M.A. 1963, University of Texas at Austin; Ph.D. 1967, Johns Hopkins University

* On sabbatical leave fall semester 1975.

Paul Arthur Lindsay, *Assistant Professor of Pathology*
B.A. 1949, M.D. 1954, Laval University, Canada

Ralph Burgess Lingeman, *Associate Professor of Pathology*
M.D. 1953, Indiana University at Bloomington

Donald Linkowski, *Associate Professor of Education*
B.A. 1961, M.S. 1963, Ph.D. 1969, State University of New York at Buffalo

Calvin Darlington Linton, *Professor of English; Dean of Columbian Colle*
of Arts and Sciences
B.A. 1935, George Washington University; M.A. 1939, Ph.D. 1940, Johns Hopkins Univers

Lewis Lipnick, *Studio Lecturer in Applied Music (Bassoon and Recorder)*
Mus.B. 1968, Peabody Institute of Baltimore

Gordon Leslie Lippitt, *Professor of Behavioral Sciences*
B.S. 1942, Litt.D. 1971, Springfield College; B.D. 1946, Yale University; M.A. 1947, University
Nebraska; Ph.D. 1959, American University

Christopher Roland Lissner, *Clinical Instructor in Pathology (Clinical Micro*
biology)
B.S. 1970, M.S. 1972, University of Southern California

Thomas Phillip George Liverman, *Professor of Mathematics*
B.A. 1941, University of Montpellier; M.A. 1948, Ph.D. 1956, University of Pennsylvania

John Lobuts, Jr., *Assistant Professor of Management Science; Assistant Dea*
of the School of Government and Business Administration
B.S. 1957, Fairmont State College; M.A. in Ed. 1965, Ed.D. 1970, George Washington Univers

Norma Maine Loeser, *Associate Professor of Business Administration*
B.A. 1958, M.B.A. 1967, D.B.A. 1971, George Washington University

John Mortimer Logsdon, *Associate Professor of Public Affairs and Politic*
Science
B.S. 1960, Xavier University, Ohio; Ph.D. 1970, New York University

Ann Foster Lohn, *Lecturer in Human Kinetics and Leisure Studies*
B.S. 1966, Purdue University; M.A. in Ed. 1973, George Washington University

William Francis Edward Long, *Associate Professor of Economics; Dean of th*
Summer Sessions
B.A. 1946, M.A. 1947, Ph.D. 1967, George Washington University

Nathene Loveland, *Professorial Lecturer in Psychology*
B.S. 1931, Johns Hopkins University; Ph.D. 1934, University of Michigan

John Carl Lowe, *Associate Professor of Geography and Regional Science*
B.A. 1958, M.A. 1960, George Washington University; Ph.D. 1969, Clark University

Gregory Ludlow, *Associate Professor of French*
Licence ès Lettres 1962, University of Paris; Ph.D. 1970, McGill University

James Lindsay Luke, *Clinical Professor of Pathology (Forensic)*
B.S. 1956, Columbia University; M.D. 1960, Case Western Reserve University

Arnost Lustig, *Professorial Lecturer in Religion*
M.A. inJour. 1951, Ing. 1954, College of Political and Social Science, Prague

Carl David Lytle, *Adjunct Professor of Genetics*
B.S. 1963, Kent State University; M.S. 1965, Cornell University; Ph.D. 1968, Pennsylvania S
University

Scott Douglas MacDonald, *Associate Professorial Lecturer in Urban a*
Regional Planning
B.A. 1970, Indiana University at Bloomington; M.R.P. 1972, University of North Carolina
Chapel Hill

William Allan MacDonald, *Professor of Art and of Archaeology*
B.A. 1940, Oberlin College; M.A. 1942, Ph.D. 1943, Johns Hopkins University

Walter Maciejewicz, *Studio Lecturer in Applied Music (Bassoon)*
Performers Diploma 1941, Curtis Institute of Music

James Hunt Maddox, *Associate Professor of English*
B.A. 1965, Princeton University; M.A. 1967, Ph.D. 1969, Yale University

Beryce Mellis MacLennan, *Professorial Lecturer in Psychology*
B.S. 1947, Ph.D. 1960, University of London

John Francis Magnotti, Jr., *Associate Professorial Lecturer in Public Administration*
B.S. 1949, U.S. Military Academy; M.A. 1966, University of Maryland; Ph.D. 1973, American University

Eugene Ross Magruder, *Associate Professor of Business Administration*
B.B.A. 1950, M.B.A. 1951, University of Texas at Austin; Ph.D. 1959, Ohio State University

James Mahoney, Jr., *Associate Professorial Lecturer in Anthropology and American Civilization*
B.F.A. 1958, Philadelphia College of Art

William Everett Maloney, *Associate Professorial Lecturer in Geology*
B.S. 1950, M.S. 1951, George Washington University

Richard Axel Malmgren, *Clinical Professor of Pathology*
B.S. 1942, Wagner College; M.D. 1945, Cornell University

Harold George Mandel, *Professor of Pharmacology*
B.S. 1944, Ph.D. 1949, Yale University

Wallace Harper Mann, *Studio Lecturer in Applied Music (Flute)*
Mus.B. 1943, Eastman School of Music

Raymond Manning, *Adjunct Professor of Biological Sciences*
B.A. 1956, M.S. 1959, Ph.D. 1963, University of Miami

Nathan Mantel, *Research Professor of Statistics*
B.S. 1939, City University of New York, City College; M.A. 1956, American University

Joseph Bernard Margolin, *Adjunct Professor of Psychology*
B.A. 1942, City University of New York, Brooklyn College; M.A. 1947, George Washington University; Ph.D. 1954, New York University

Anthony Marinaccio, *Professor of Education*
Ed.B. 1937, Central Connecticut State College; M.A. 1939, Ohio State University; Ph.D. 1949, Yale University; LL.D. 1961, Parsons College

John Edwin Marlow, *Studio Lecturer in Applied Music (Guitar)*
B.A. 1963, American University

William Laverne Marsh, *Associate Professor of Pathology and of Anesthesiology*
B.S. 1942, Purdue University; M.D. 1946, State University of New York at Buffalo

Vernon Edward Martens, *Associate Clinical Professor of Pathology*
B.S. 1935, M.D. 1937, St. Louis University

John Sawyer Martin, Jr., *Studio Lecturer in Applied Music (Cello)*

William Martineau, *Assistant Professor of Sociology*
B.A. 1965, Fairfield University; M.A. 1967, Ph.D. 1971, University of Notre Dame

Anthony James Mastro, *Professor of Accounting*
B.S. 1951, M.B.A. 1953, New York University; M.A. 1963, University of Notre Dame; C.P.A. 1955, State of New Jersey

Mary Jean Matthews, *Professor of Pathology*
B.A. 1946, M.D. 1949, George Washington University

Thomas May, *Lecturer in Biological Sciences*
B.S. 1969, University of Alabama

Paul Mazel, *Professor of Pharmacology and of Anesthesiology*
B.S. 1946, Medical College of Virginia of Virginia Commonwealth University; M.S. 1955, Trinity University; Ph.D. 1960, Vanderbilt University

Onofrio Louis Mazzatenta, *Associate Professorial Lecturer in Journalism*
B.A. 1960, Kent State University; M.S. 1963, Northwestern University

Guido Ettore Mazzeo, *Professor of Romance Languages*
B.A. 1936, City University of New York, City College; M.A. 1938, Ph.D. 1961, Columbia University

David McAleavey, *Instructor in English*
B.A. 1968, M.F.A. 1972, Cornell University

Michael McCally, *Associate Professor of Health Care Sciences and of Physiology*
B.A. 1956, Princeton University, M.D. 1960, Case Western Reserve University, Ph.D. 1970, Ohio State University

George Edward McCandlish, *Professor of English*
B.A. 1936, University of Washington; Ph.D. 1962, Harvard University

John Francis McCarthy, Jr., *Associate Professor of Business Administration*
B.A. 1936, Duquesne University; M.L. 1955, University of Pittsburgh

Muriel Hope McClanahan, *Associate Professor of English*
B.A. 1935, Colorado College; M.A. 1937, Ph.D. 1940, University of Pittsburgh

William Agnew McClelland, *Professorial Lecturer in Psychology*
B.A. 1941, Brown University; M.A. 1946, Ph.D. 1948, University of Minnesota

Kenneth Frederick McClure, *Professorial Lecturer in Commercial Law*
B.S. 1931, M.S. 1932, Wichita State University; LL.B. 1941, University of Maryland

Mary Jacobs McCrea, *Assistant Research Professor of Ophthalmology and o*
Physiology
B.A. 1964, Trinity College, District of Columbia; M.S. 1966, Ph.D. 1969, University of Illino
at Urbana-Champaign

James Kenneth McDonald, *Associate Professor of International Affairs*
B.A. 1954, Yale University; B.Litt. 1961, University of Oxford

John Patrick McGill, *Associate Professorial Lecturer in Journalism*
B.S. 1967, Georgetown University

Dorn Charles McGrath, Jr., *Professor of Urban Planning*
B.A. 1952, Dartmouth College; M.C.P. 1959, Harvard University

Margaret McIntyre, *Associate Professor of Education*
B.S. in Ed. 1939, State University of New York at Buffalo; M.A. 1944, Northwestern Universit
A.P.C. 1963, George Washington University

Ruth Blumenfeld McKay, *Professorial Lecturer in Anthropology*
B.A. 1954, City University of New York, Brooklyn College; M.A. 1961, Ph.D 1965, Universit
of Pennsylvania

Cornelius Patrick McKelvey, *Instructor in Health Care Administration*
B.S. 1963, Philadelphia College of Pharmacy; M.S. 1970, University of Maryland; M.A.
H.C.A. 1973, George Washington University

John Johnson McMillan, *Associate Professor of Psychiatry and Behavioral*
Sciences (Psychology)
B.A. 1943, Wake Forest University; M.A. 1948, Ph.D. 1951, Duke University

Marian McNabb, *Studio Lecturer in Applied Music (Piano and Organ)*
Mus.B. 1930, University of Kansas; M.S. in Mus. 1949, Union Theological Seminary

Robert Emit McNelis, *Assistant Professorial Lecturer in Education*
B.S. 1954, West Chester State College; M.A. in Ed. 1961, Ed.D. 1968, George Washingt
University

Cornelius Glen McWright, *Adjunct Professor of Forensic Sciences and o*
Biological Sciences
B.A. 1952, University of Evansville; M.S. 1965, Ph.D. 1970, George Washington University

Kenneth Everett Melson, *Associate Professorial Lecturer in Forensic Scienc*
B.A. 1970, Denison University; J.D. 1973, George Washington University

Malcolm Lee Meltzer, *Professor of Psychology; Director, Graduate Trainin*
in Clinical Psychology
B.A. 1951, Western Maryland College; M.A. 1954, Ph.D. 1957, Catholic University of Americ

Robert Seamen Melville, *Clinical Professor of Pathology (Laboratory Medicine)*
B.A. 1932, Clark University; Ph.D. 1950, University of Iowa

Henry Merchant, *Associate Professor of Biology*
B.S. 1964, M.S. 1966, University of Maryland; Ph.D. 1970, Rutgers University, New Brunswi

Bernard Matthew Mergen, *Associate Professor of American Civilization*
B.A. 1959, University of Nevada, Reno; M.A. 1960, Ph.D. 1968, University of Pennsylvania

Carl Ronald Merril, *Adjunct Assistant Professor of Genetics*
B.S. 1958, College of William and Mary; M.D. 1962, Georgetown University

Joseph Louis Métivier, Jr., *Professor of Romance Languages; Assistant Dea*
of Columbian College of Arts and Sciences
B.A. 1951, M.A. 1955, George Washington University

Lothar Metzl, *Professorial Lecturer in International Affairs*
Dr.Jur. 1929, University of Vienna

Franz Henry Michael, *Professor of International Affairs and Far Eastern History*
Sinological Diploma 1930, University of Berlin; Referendar 1931, Dr.Jur. 1933, University of Freiburg

Mike Millan, *Associate Professorial Lecturer in Human Kinetics and Leisure Studies*
B.S. in P.E. 1947, M.A. in Ed. 1950, George Washington University

Jack William Millar, *Vivian Gill Professor of Epidemiology and Environmental Health*
B.A. 1945, Stanford University; M.D. 1947, George Washington University, M.P.H. 1951, M.S. in Hygiene and Tropical Medicine 1952, Harvard University

Celesta Ann Miller, *Special Lecturer in Pathology*

Charles Russell Miller, *Associate Professor of Business Administration*
B.S. 1945, U.S. Naval Academy; M.B.A. 1957, Ph.D. 1966, University of California, Los Angeles

Elmer Thomas Miller, *Assistant Professorial Lecturer in Geology*
B.S. 1938, University of Richmond

Frank Nelson Miller, Jr., *Professor of Pathology*
B.S. 1943, M.D. 1948, George Washington University

Lillian Miller, *Special Lecturer in Art and American Civilization*
B.A. 1943, Radcliffe College; M.A. 1948, Ph.D. 1962, Columbia University

Mary Fetler Miller, *Adjunct Assistant Professor of Russian*
B.A. 1943, Northwestern University; M.A. 1966, University of Michigan

John Minna, *Adjunct Professor of Genetics*
B.A. 1963, M.D. 1967, Stanford University

Clarence Cowan Mondale, *Professor of American Civilization; Director, Division of Experimental Programs*
B.A. 1947, Macalester College; M.A. 1954, Ph.D. 1960, University of Minnesota

Dorothy Adele Moore, *Associate Professor of Education*
B.A. 1954, University of Maryland; M.A. 1959, A.P.C. 1964, Ed.D. 1970, American University

Robert Hamilton Moore, *Professor of English*
B.A. 1934, M.A. 1938, Indiana University at Bloomington; Ph.D. 1948, University of Illinois at Urbana-Champaign

Brian Moores, *Visiting Assistant Professor of Chemistry*
B.S. 1963, Bates College; M.S. 1965., Ph.D. 1968, University of Illinois at Urbana-Champaign

John Andrew Morgan, Jr., *Professor of Political Science and Public Affairs*
B.A. 1957, Stetson University; M.A. 1959, Ph.D. 1963, Duke University

Glenn Ellis Morris, *Associate Professor of Psychiatry and Behavorial Sciences (Allied Health) and of Health Care Administration*
B.S. 1933, M.A. 1939, University of Illinois at Urbana-Champaign; M.S. in H.A. 1956, Northwestern University

Mabel Elizabeth Inco Morris, *Associate Professorial Lecturer in Mathematics*
B.A. 1923, University of Evansville; M.A. 1928, University of Chicago

Dennis Ervin Morse, *Assistant Professor of Anatomy*
B.A. 1969, Hastings College; M.S. 1971, Ph.D. 1973, University of North Dakota

James Norman Mosél, *Professor of Psychology*
B.A. 1940, Colgate University, M.A. 1941, Columbia University

Charles Arthur Moser, *Associate Professor of Russian*
B.A. 1956, Yale University, M.A. 1958, Ph.D. 1962, Columbia University

Peter Parker Muirhead, *Professorial Lecturer in Education*
B.S. 1934, State University of New York at Geneseo-Albany, M.A. 1942, University of Rochester

Robert Phillip Multhauf, *Adjunct Professor of History*
B.S. 1941, Iowa State University of Science and Technology; M.A. 1950, Ph.D. 1953, University of California, Berkeley

Joseph Patrick Murphy, *Professorial Lecturer in Business Administration*
B.A. 1949, LL.B. 1950, LL.M. 1952, George Washington University

Philip Anthony Musgrove, *Associate Professorial Lecturer in Economics*
B.A. 1962, Haverford College; M.P.A. 1964, Princeton University; Ph.D. 1974, Massachusetts Institute of Technology

Leonard Nadler, *Professor of Education*
B.B.A. 1948, M.S. 1950, City University of New York, City College; Ed.D. 1962, Columbia University

Charles Rudolph Naeser, *Professor of Chemistry*
B.S. 1931, University of Wisconsin—Madison; M.S. 1933, Ph.D. 1935, University of Illinois at Urbana-Champaign

William Guy Nash, *Assistant Professor of Biology*
B.S. 1963, M.A. 1965, Ph.D. 1969, University of Michigan

Honey W. Nashman, *Assistant Professor of Human Kinetics and Leisure Studies; Director of the Office of Laboratory Experience, School of Education*
B.S. 1956, New York University; M.S. 1957, Smith College

Deborah Rose Nason, *Lecturer in English*
B.A. 1970, University of Chicago; M.A. 1972, Johns Hopkins University

*Nadine Nadeshda Natov, *Associate Professor of Russian*
M.A. 1939, Ph.D. 1941, Pedagogical Institute of Modern Languages, Soviet Union; Ph.D. 1969, University of Michigan

Henry Richard Nau, *Assistant Professor of Political Science and International Affairs*
B.S. 1963, Massachusetts Institute of Technology; M.A. 1967, Ph.D. 1972, Johns Hopkins University

Anna Louise Kasten Nelson, *Associate Professorial Lecturer in History*
B.A. 1954, M.A. 1956, University of Oklahoma; Ph.D. 1972, George Washington University

David Nelson, *Professor of Mathematics*
B.A. 1939, M.A. 1940, Ph.D. 1946, University of Wisconsin—Madison

Bjorn Karsten Netland, *Instructor in German; Assistant Dean of the Division of University Students*
B.A. 1971, M.A. 1973, George Washington University

William Newman, *Professor of Pathology*
B.A. 1941, University of Wisconsin—Madison; M.D. 1946, New York University

Elizabeth Sutherland Neyman, *Assistant Professor of Spanish*
B.A. 1957, University of California, Berkeley; M.A. 1959, George Washington University

Benjamin Nimer, *Professor of Political Science and International Affairs*
B.A. 1942, Ph.D. 1953, University of Chicago

Daniel Charles Nippes, *Assistant Professorial Lecturer in Forensic Sciences*
B.S. 1968, M.S. 1972, University of Pittsburgh, M.S. in Ed. 1971, University of Southern California

Henry Jason Norris, *Associate Clinical Professor of Pathology*
B.A. 1954, Linfield College; M.D. 1958, University of Rochester

Robert Anthony Norris, *Studio Lecturer in Applied Music (Guitar)*

Mary Elizabeth Norton, *Associate Professorial Lecturer in Classics*
B.A. 1935, M.A. 1938, University of Michigan

Ylda Farkas Novik, *Studio Lecturer in Applied Music (Piano)*
Mus.B. 1943, Cleveland Institute of Music

John Warren Nystrom, *Professorial Lecturer in Geography and Regional Science*
B.A. 1936, M.A. 1937, Ph.D. 1942, Clark University

Thomas O'Connor, *Professorial Lecturer in Management Science*
B.S. 1947, U.S. Naval Academy; M.B.A. 1956, Harvard University; Ph.D. 1965, Stanford University

Norman Gabrial Oglesby, *Adjunct Instructor in Health Care Administration*
B.S. in Gen.Std. 1970, M.B.A. 1971, George Washington University

Peter Dean Olch, *Professorial Lecturer in Pathology (History of Medicine)*
B.A. 1951, Pomona College; M.D. 1955, Johns Hopkins University

---

* On sabbatical leave fall semester 1975

Dennis Sophian O'Leary, *Associate Professor of Medicine and of Pathology (Laboratory Medicine)*
B.A. 1960, Harvard University; M.D. 1964, Cornell University

George Andrew Olkhovsky, *Associate Professor of Russian*
B.A. 1956, M.A. 1957, University of Minnesota; Ph.D. 1968, Georgetown University

Mark Daniel Olson, *Assistant Professor of Anatomy and of Ophthalmology*
B.A. 1968, Concordia College, Minnesota; M.S. 1970, Ph.D. 1973, University of North Dakota

Ruth Helm Osborn, *Associate Professorial Lecturer in Women Studies*
B.S. 1940, University of Minnesota; M.A. in Ed. 1946, Ed.D. 1963, George Washington University

Türker Özdogan, *Assistant Professor of Ceramics*
Diploma 1967, School of Applied Fine Arts, Turkey; M.F.A. 1972, George Washington University

Randall Kent Packer, *Associate Professor of Biology*
B.S. 1967, Lock Haven State College; Ph.D. 1971, Pennsylvania State University

Harry Robert Page, *Professor of Business Administration*
B.A. 1941, Michigan State University; M.B.A. 1950, Harvard University; Ph.D. 1966, American University

Chei-Min Paik, *Associate Professor of Accounting and Quantitative Methods*
B.B.A. 1957, University of Minnesota; M.B.A. 1959, University of California, Los Angeles; D.B.A. 1963, Harvard University

Howard Erwin Paine, *Associate Professorial Lecturer in Journalism*
B.A. 1950, American International College

Richard Emery Palmer, *Associate Clinical Professor of Pathology*
B.A., M.D. 1944, George Washington University

Vincent Paul Parady, *Instructor in Drama*
B.A. 1958, University of Maine at Orono; M.F.A. 1966, Catholic University of America

Salvatore Rocco Paratore, *Associate Professor of Education*
B.A. 1957, Colgate University; M.S. 1967, Yeshiva University; Ph.D. 1973, Syracuse University

William Carleton Parke, *Associate Professor of Physics*
B.S. 1963, Ph.D. 1967, George Washington University

Kittie Fenley Parker, *Professor of Botany*
B.A. 1930, M.A. 1932, University of California, Berkeley; Ph.D. 1946, University of Arizona

William Axel Parker, *Associate Professorial Lecturer in Health Care Administration*
B.S. 1945, University of Illinois at Urbana-Champaign; M.P.H. 1950, University of California, Berkeley; M.B.A. 1962, George Washington University

Dee Rich Parkinson, *Assistant Clinical Professor of Pathology*
M.D. 1943, George Washington University

Richard Parnas, *Studio Lecturer in Applied Music (Violin and Viola)*

Robert Parris, *Associate Professor of Music*
B.S. in Mus.Ed. 1945, M.S. in Mus.Ed. 1946, University of Pennsylvania; B.S. in Mus.Comp. 1948, Juilliard School of Music

Gail Paster, *Instructor in English*
B.A. 1966, Smith College; M.Phil. 1970, Ph.D. 1972, Yale University

Donald Clark Paup, *Adjunct Associate Professor of Human Kinetics and Leisure Studies*
B.A. 1961, Occidental College; M.S. 1969, Ph.D. 1970, Tulane University of Louisiana

David Leo Pawson, *Adjunct Associate Professor of Biological Sciences*
B.S. 1960, M.S. 1961, Ph.D. 1964, Victoria University, New Zealand

Barry John Pearson, *Assistant Clinical Professor of Pathology (Laboratory Medicine)*
B.S. 1964, Muhlenberg College; M.D. 1968, University of Pennsylvania

Roland Lee Peckham, *Special Lecturer in Pathology*

Eldor Olin Pederson, *Assistant Professor of Geography and Regional Science*
B.A. 1966, University of Washington; C.Ph. 1969, Ph.D. 1974, University of California, Berkeley

Iraline Green Peniston, *Assistant Professorial Lecturer in Forensic Sciences*
B.A. 1969, Howard University; J.D. 1972, University of Michigan

John George Perazich, *Assistant Professorial Lecturer in Forensic Sciences*
B.A. 1963, Oberlin College; LL.B. 1967, George Washington University; LL.M. 1969, Georgetown University

Thomas Paul Perazzoli, *Studio Lecturer in Applied Music (Flute)*

Lorenzo Laureano Perez, *Assistant Professorial Lecturer in Economics*
B.B.A. 1966, University of Florida; Ph.D. 1972, University of Pennsylvania

Malinee Peris, *Studio Lecturer in Applied Music (Piano)*
Licentiate 1946, 1947, Trinity College of Music, London; Licentiate 1950, Royal Academy of Music, England

Theodore Peter Perros, *Professor of Chemistry and of Forensic Sciences*
B.S. 1946, M.S. 1949, Ph.D. 1952, George Washington University

Dominique Pessayre, *Assistant Research Professor of Pharmacology*
M.D. 1973, University of Paris

Elmer Bruce Peters, *Associate Professorial Lecturer in Management Science*
B.S. 1949, U.S. Military Academy; D.B.A. 1972, George Washington University

Ruth Irene Peterson, *Associate Professor of Education*
B.S. 1945, State University of New York at Buffalo; M.S. 1946, Syracuse University; Ph.D. 1971, American University

John Charles Petricciani, *Adjunct Professor of Genetics*
B.S. 1958, Rensselaer Polytechnic Institute; M.S. 1960, University of Nevada, Reno; M.D. 1967, Stanford University

Vladimir Petrov, *Professor of International Affairs*
M.A. 1961, Ph.D. 1965, Yale University

William Donald Petterson, *Studio Lecturer in Applied Music (Piano)*
Mus.B. 1948, University of Rochester; Mus.M. 1950, University of Michigan

Carl Herman Pfuntner, *Associate Professor of Philosophy*
B.A. 1949, M.A. 1953, George Washington University; Ph.D. 1967, Georgetown University

Marianne Ruth Phelps, *Assistant Professorial Lecturer in Education; Dean of Students*
B.A. 1961, University of Michigan; M.S. 1964, M.A. 1965, University of Wisconsin—Madison; M.Phil. 1973, George Washington University

Ewing Lakin Phillips, *Professor of Psychology; Director, Counseling Center*
B.S. 1937, Central Missouri State College; M.A. 1940, University of Missouri—Columbia; Ph.D. 1949, University of Minnesota

Jack Warren Pierce, *Adjunct Professor of Geology*
B.S. 1949, M.S. 1950, University of Illinois at Urbana-Champaign; Ph.D. 1964, University of Kansas

Jane Wheeler Pires-Ferreira, *Assistant Research Professor of Anthropology*
B.A. 1964, American University

Judith Ann Abrams Plotz, *Associate Professor of English*
B.A. 1960, Radcliffe College; B.A. (Cantab.) 1962, M.A. (Cantab.) 1966, University of Cambridge; Ph.D. 1965, Harvard University

Dennis Dale Pointer, *Associate Professorial Lecturer in Health Care Administration*
B.S. 1967, Iowa State University of Science and Technology; Ph.D. 1971, University of Iowa

Herman Pollack, *Research Professor of International Affairs*
B.S. 1940, City University of New York, City College; M.A. 1964, George Washington University

Paul John Poppen, *Assistant Professor of Psychology*
B.A. 1969, Central University of Iowa; Ph.D. 1973, Cornell University

Zvi Porath, *Assistant Professorial Lecturer in Hebrew*
B.S. in B.A. 1971, Georgetown University

Ben Posner, *Professorial Lecturer in Public Administration*
B.S. in B.A. 1936, University of Arizona; M.A. in Govt. 1941, George Washington University; Ph.D. 1962, American University

Joseph Raymond Potter, Jr., *Associate Professorial Lecturer in Business Administration*
B.S. 1954, University of Maryland; M.B.A. 1963, Case Western Reserve University

Georgette Powell, *Clinical Instructor in Art Therapy*
B.F.A. 1973, Howard University

Francisco Prats, *Professor of Physics*
Licenciado en Ciencias Fisico 1946, University of Madrid; Ph.D. 1958, University of Maryland

Michael Lee Pratt, *Clinical Instructor in Pathology (Blood Banking)*
B.S. 1966, University of Iowa

Milo Prodanovich, *Clinical Instructor in Pathology (Clinical Chemistry)*
B.S. 1965, M.A. 1968, California State University, San Diego

*Robert William Prouty, *Assistant Professor of Special Education*
B.S. 1960, State University of New York, College at Geneseo; M.S. 1961, Syracuse University

Stephen Henry Prussing, *Studio Lecturer in Applied Music (Voice); Director of Choral Groups*
B.A. 1945, Occidental College; Postgraduate Diploma 1948, Juilliard School of Music

Charles William Puffenbarger, *Associate Professorial Lecturer in Journalism*
B.S. 1951, University of Maryland; M.A. 1964, George Washington University

Maurice Pierre Pujol, *Professorial Lecturer in Accounting*
B.B.A. 1949, LL.B. 1956, Loyola University, New Orleans

Ralph Elliott Purcell, *Professor of Political Science*
B.A. 1940, Florida Southern College; M.A. 1941, Duke University; Ph.D. 1949, University of Wisconsin—Madison

Jon Alrik Quitslund, *Associate Professor of English*
B.A. 1961, Reed College; Ph.D. 1967, Princeton University

Sonya Antoinette Quitslund, *Assistant Professor of Religion*
B.A. 1958, Seattle University; M.A. 1964, Ph.D. 1967, Catholic University of America

Roland Cloyd Raffaelle, *Studio Lecturer in Applied Music (Guitar)*

Margaret Mary Hupp Ramsay, *Lecturer in Human Kinetics and Leisure Studies*
B.S. 1957, Purdue University; M.S. 1958, University of Wisconsin—Madison

Samuel Edward Ramsay, *Studio Lecturer in Applied Music (French Horn)*

Bernard Ramundo, *Professorial Lecturer in Law*
B.A. 1947, City University of New York, City College; LL.B. 1949, M.A. 1957, Columbia University; Ph.D. 1966, American University

Martha Norman Rashid, *Professor of Education*
Ed.B. 1949, State University of New York, College at Geneseo; M.A. 1951, Ph.D. 1955, University of Iowa

Marguerite Rawalt, *Professorial Lecturer in Women Studies*
B.A., J.D. 1933, LL.M. 1936, George Washington University; LL.D. 1945, Baylor University

George Walter Recker, *Studio Lecturer in Applied Music (Trumpet)*

Donald Henry Reddick, *Assistant Professorial Lecturer in Education*
B.A. 1952, Ed.M. 1953, University of Maryland; Ed.D. 1965, George Washington University

Charles Reeder, *Assistant Research Professor of Education*
B.A. 1968, California State University at San Diego; M.A. 1970, Michigan State University; Ph.D. 1974, University of Missouri-Columbia

Thomas Sargent Reese, *Professorial Lecturer in Anatomy*
B.A. 1957, Harvard University; M.D. 1962, Columbia University

John Palmer Reesing, Jr., *Professor of English*
B.A. 1941, Bayor University; M.A. 1942, Tulane University of Louisiana; Ph.D. 1954, Harvard University

Philip Norman Reeves, *Associate Professor of Health Care Administration*
M.B.A. 1959, University of Chicago; D.B.A. 1970, George Washington University

Mary O'Connell Regan, *Assistant Professorial Lecturer in Speech*
B.A. 1961, College of New Rochelle; M.A. 1964, Columbia University; Ph.D. 1970, New York University

Joan Roddy Regnell, *Assistant Professor of Speech*
B.A. 1954, M.A. 1960, George Washington University

*On leave of absence academic year 1975-76.

Harald Alfred Rehder, *Adjunct Professor of Biological Sciences*
B.A. 1929, Bowdoin College; M.A. 1933, Harvard University; Ph.D. 1934, George Washington University

Bernard Reich, *Associate Professor of Political Science and International Affairs*
B.A. 1961, City University of New York, City College; M.A. 1963, Ph.D. 1964, University of Virginia

Melvin Reich, *Associate Professor of Microbiology*
B.S. 1953, City University of New York, City College; M.S. 1957, Ph.D. 1960, Rutgers University, New Brunswick

William Martin Reynolds, *Professor of Speech; Director of Forensics*
B.A. 1950, Wichita State University; M.A. 1957, Ph.D. 1960, University of Florida

Peter Howard Rheinstein, *Assistant Professorial Lecturer in Forensic Sciences*
B.A. 1963, M.S. 1964, Michigan State University; M.D. 1967, Johns Hopkins University; J.D. 1973, University of Maryland

Eric Foster Rhodes, *Associate Professorial Lecturer in Education*
B.A. in Ed. 1950, M.A. in Ed. 1952, Ed.D. 1967, George Washington University

Leo Paul Ribuffo, *Assistant Professor of History*
B.A. 1966, Rutgers University, New Brunswick; M.Phil. 1969, Yale University

*Charles Rice, *Associate Professor of Psychology*
B.S. 1954, Iowa State University of Science and Technology; Ph.D. 1959, Case Western Reserve University

Mary Rice, *Adjunct Associate Professor of Biological Sciences*
B.A. 1947 Drew University; M.A. 1949, Oberlin College; Ph.D. 1966, University of Washington

LeRoy Riddick, *Assistant Clinical Professor of Pathology (Forensic)*
B.A. 1954, Princeton University; M.A. 1965, Columbia University; M.D. 1969, New Jersey College of Medicine and Dentistry

James Willis Robb, *Professor of Romance Languages*
B.A. 1939, Colgate University; M.A. 1950, Middlebury College; Ph.D. 1958, Catholic University of America

Mary Louise Robbins, *Professor of Microbiology*
B.A. 1934, American University; M.A. 1940, Ph.D. 1944, George Washington University

Philip Robbins, *Associate Professor of Journalism*
B.A. 1952, Washington and Lee University; M.S. 1955, Columbia University

Donald Robinson, *Adjunct Associate Professor of Political Science*
B.A. 1958, M.A. 1959, Northwestern University; Ph.D. 1963, American University

Lilien Filipovitch Robinson, *Assistant Professor of Art*
B.A. 1962, M.A. 1965, George Washington University

Patsy June Robinson, *Assistant Professor of Pathology (Microbiology)*
B.S. 1954, Louisiana State University and Agricultural and Mechanical College; M.S. 1964, Michigan State University

Thomas Robert Robinson, *Assistant Professorial Lecturer in Economics*
B.A. in Govt. 1965, M.Phil. 1970, Ph.D. 1974, George Washington University

Elie Rogers, *Associate Professorial Lecturer in Journalism*
B.A. 1955, University of Colorado

James Holt Rollen, *Special Lecturer in Pathology*

Daniel David Roman, *Professor of Management Science*
B.S. in B.A. 1949, M.A. 1953, Ph.D. 1956, University of Southern California

Marjorie Ann Romines, *Instructor in English*
B.A. 1964, Central Methodist College; M.A. 1968, Tufts University

Clyde Forrest Roper, *Adjunct Associate Professor of Biological Sciences*
B.S. 1959, Transylvania University; M.S. 1962, Ph.D. 1967, University of Miami

Colin Campbell Rorrie, Jr., *Associate Professorial Lecturer in Health Care Administration*
B.A. 1964, Beloit College; M.A. 1966, Ph.D. 1968, University of Iowa

Carolyn Rusch Rose, *Lecturer in Art and Anthropology*
B.A. 1971, Sweet Briar College

---

* On sabbatical leave fall semester 1975.

Joseph Rosewater, *Adjunct Associate Professor of Biological Sciences*
B.S. 1950, M.S. 1956, University of New Hampshire; Ph.D. 1960, Harvard University

Lawrence Allen Rothblat, *Associate Professor of Psychology*
B.A. 1964, M.A. 1967, Ph.D. 1968, University of Connecticut

William Woodin Rowe, *Associate Professor of Russian*
B.A. 1956, Harvard University; Ph.D. 1968, New York University

David Alton Rowley, *Associate Professor of Chemistry; Assistant Dean of the Graduate School of Arts and Sciences*
B.S. 1963, M.S. 1964, State University of New York at Albany; Ph.D. 1968, University of Illinois at Urbana-Champaign

Jay Rubin, *Assistant Professorial Lecturer in American Civilization*
B.A. 1970, J.D. 1973, University of Pittsburgh

Laurel Beedon Rule, *Assistant Professorial Lecturer in English*
B.A. 1968, Gustavus Adolphus College; M.A. 1971, St. Thomas College; Ed.D. 1974, Virginia Polytechnic Institute and State University

Constance Adelaide Russell, *Studio Lecturer in Applied Music (Piano)*
Artist Diploma 1938, Curtis Institute of Music; Artist Diploma and Teacher's Certificate 1939, American Conservatory at Fontainbleau

William Rutiser, *Assistant Professorial Lecturer in Statistics*
B.S. (Machine Computers) 1967, George Washington University

Robert Clinton Rutledge, *Associate Professor of English; Assistant Dean of Columbian College of Arts and Sciences*
B.A. 1940, University of Virginia; M.A. 1957, Ph.D. 1966, George Washington University

Bradley William Sabelli, *Instructor in Speech and Drama*
B.F.A. 1970, Florida Atlantic University; M.A. 1972, California State University, Humboldt; M.F.A. 1974, George Washington University

Howard Morley Sachar, *Professor of History*
B.A. 1947, Swarthmore College; M.A. 1950, Ph.D. 1953, Harvard University

Pilar G. Suelto de Sáenz, *Associate Professor of Spanish*
Licenciada 1953, University of Madrid; M.A. 1957, Bryn Mawr College; Ph.D. 1966, University of Maryland

Nirmal Saini, *Associate Professor of Pathology*
M.B., B.S. 1957, King Edward Medical College, India

Carol Ruth St. Cyr, *Professor of Education*
B.S. 1946, Eastern Connecticut State College; M.A. 1949, Trinity College, Connecticut; Ph.D. 1955, University of Michigan

Rolando Laborce Santos, *Special Lecturer in Pathology*

Barton Malcolm Sapin, *Professor of International Affairs and Political Science; Dean of the School of Public and International Affairs*
B.A. 1945, M.A. 1947, Columbia University; Ph.D. 1953, Princeton University

Robert Sauer, *Clinical Professor of Pathology (Comparative)*
D.V.M. 1952, University of Pennsylvania

Thomas Charles Sawyer, *Lecturer in Speech*
B.A. 1967, M.A. 1968, Ph.D. 1973, Ohio State University

Allan Neil Schechter, *Professorial Lecturer in Biochemistry*
B.A. 1959, Cornell University; M.D. 1963, Columbia University

Stefan Otto Schiff, *Associate Professor of Zoology*
B.S. 1952, Roanoke College; Ph.D. 1964, University of Tennessee, Knoxville

Richard Harold Schlagel, *Professor of Philosophy*
B.S. 1949, Springfield College; M.A. 1952, Ph.D. 1955, Boston University

Jeffrey Schlom, *Adjunct Associate Professor of Genetics*
B.S. 1964, Ohio State University; M.S. 1966, Adelphi University; Ph.D. 1969, Rutgers University, New Brunswick

Terry Lane Schmidt, *Assistant Professorial Lecturer in Health Care Administration*
B.S. 1965, Bowling Green State University; M.B.A. 1971, George Washington University

William Edward Schmidt, *Professor of Chemistry*
B.S. 1943, M.S. 1950, George Washington University; M.A., Ph.D. 1953, Princeton University

Albert John Schwab, *Adjunct Associate Professor of Health Care Administration*
B.A. 1962, University of California, San Diego; M.S. 1961, U.S. Naval Postgraduate School

Harry Alfred Schwamm, *Associate Clinical Professor of Pathology*
B.A. 1950, New York University; M.D. 1957, University of Zurich

Maurice Herbert Schwartz, *Professorial Lecturer in Management Science*
B.A. 1941, University of Illinois at Urbana-Champaign

Milton Allan Schwartz, *Associate Professorial Lecturer in Statistics*
B.S. 1938, City University of New York, City College

*Lois Green Schwoerer, *Associate Professor of History*
B.A. 1949, Smith College; M.A. 1952, Ph.D. 1956, Bryn Mawr College

Norman Orville Scribner, Jr., *Assistant Professorial Lecturer in Music (Organ)*
Mus.B. 1961, Peabody Institute of Baltimore

Robert Curtis Sedwick, *Professor of Business Administration; Director, George Washington University Program (Tidewater Area Center), Fort Monroe, Virginia*
B.S.E. 1949, U.S. Coast Guard Academy; M.E.A. 1960, D.B.A. 1964, George Washington University

Aaron Bear Seidman, *Associate Professorial Lecturer in Hebrew*
B.A. 1941, Rabbi 1946, Yeshiva University; M.A. 1944, New York University

Jo Anne Sellars, *Lecturer in Human Kinetics and Leisure Studies*
B.A. 1957, University of Tennessee, Knoxville

Mohammad Shahvari, *Assistant Professor of Anesthesiology and of Pharmacology*
M.D. 1968, Pahlavi University, Iran; M.S. 1973, Temple University

John Shapley, *Professorial Lecturer in Art*
B.A. 1912, University of Missouri—Columbia; M.A. 1913, Princeton University; Ph.D. 1914 University of Vienna

Robert Poindexter Sharkey, *Professor of Economic History*
B.A. 1948, Princeton University; Ph.D. 1958, Johns Hopkins University

Thomas Elliott Shaughnessy, *Associate Professor of Management, George Washington University Program (Tidewater Area Center), Fort Monroe, Virginia*
B.S. 1933, Massachusetts Institute of Technology; M.A. in Ed. 1948, George Washington University Ed.D. 1957, Johns Hopkins University

Lawrence Shaw, *Research Professor of Statistics*
B.A. 1935, Ohio Wesleyan University; M.A. 1936, University of Pennsylvania

Stanley Newton Sherman, *Associate Professor of Business Administration*
B.A. 1952, M.B.A. 1960, University of Maryland

Richard Lance Shields, *Lecturer in Speech*
B.A. 1973, University of Maryland

Chung-wen Shih, *Professor of Chinese*
B.A. 1945, St. John's University, China; M.A. 1949, Ph.D. 1955, Duke University

Jay Robert Shotel, *Assistant Professor of Special Education*
B.A. 1967, Ed.M. 1970, Ed.D. 1972, Temple University

Robert George Shouldice, *Assistant Professor of Health Care Administration*
B.A. 1966, Lycoming College; M.B.A. 1969, D.B.A. 1974, George Washington University

Walter Allen Shropshire, Jr., *Professorial Lecturer in Botany*
B.S. 1954, M.S. 1956, Ph.D. 1958, George Washington University

Eugene Joseph Shuchart, *Assistant Professorial Lecturer in Accounting*
B.S. 1950, Villanova University; M.B.A. 1951, University of Pennsylvania; C.P.A. 1956, State of Virginia

Harvey Alan Shulman, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1970, Rochester Institute of Technology

* On leave of absence fall semester 1975.

Robert Hermann Shumway, *Professor of Statistics*
B.A. 1958, Carleton College; M.S. 1960, Iowa State University of Science and Technology; Ph.D. 1965, George Washington University

Sally Annette Sibley, *Assistant Professorial Lecturer in Psychology*
B.A. 1962, Winthrop College; M.S. 1964, Ph.D. 1966, Florida State University

Frederic Richard Siegel, *Professor of Geochemistry*
B.A. 1954, Harvard University; M.S. 1958, Ph.D. 1961, University of Kansas

Robert Sumner Sigafoos, *Professorial Lecturer in Botany*
B.S. 1942, M.S. 1943, Ohio State University; M.A. 1949, Ph.D. 1951, Harvard University

Gaston Sigur, *Professor of International Affairs; Director, Institute for Sino-Soviet Studies*
Ph.D. 1957, University of Michigan

David Elliot Silber, *Associate Professor of Psychology*
B.A. 1958, Wayne State University; M.A. 1960, Ohio University; Ph.D. 1965, University of Michigan

Peter Silberman, *Associate Professorial Lecturer in Journalism*
B.A. 1952, City University of New York, Queens College; M.A. 1956, University of Missouri—Columbia

Herbert Myron Silverberg, *Associate Professorial Lecturer in Forensic Sciences*
B.A. 1961, LL.B. 1968, University of Pennsylvania

Natalia Timo Fejeva Simes, *Assistant Professorial Lecturer in Russian*
M.A. 1968, Pedagogical Institute of Foreign Languages, U.S.S.R.

Kendal Washburn Simmons, *Associate Professorial Lecturer in Management Science*
B.S. 1941, U.S. Naval Academy; M.A. 1948, University of California, Los Angeles; M.B.A. 1963, D.B.A. 1969, George Washington University

Suzanne Lee Simons, *Associate Professor of Anthropology*
B.A. 1948, Ohio State University; M.A. 1964, Ph.D. 1969, University of New Mexico

Margaret Lee Sinclair, *Lecturer in Human Kinetics and Leisure Studies*

Richard Sines, *Assistant Professor of Economics*
B.A. 1965, Miami University; M.S. 1969, M.A. 1972, Ohio State University

Daniel Sinick, *Professor of Education*
B.A. 1936, City University of New York, City College; M.A. 1937, State University of New York at Albany; Ph.D. 1955, New York University

Eric Scott Sirulnik, *Visiting Associate Professor of Law and Forensic Sciences*
B.A. 1965, Franklin and Marshall College; J.D. 1968, Boston University; LL.M. 1970, George Washington University

David Lawrence Skolnick, *Instructor in Speech*
B.A. 1969, M.A. 1973, Pennsylvania State University

William Steven Slimak, *Special Lecturer in Pathology*

Arthur Hall Smith, *Visiting Assistant Professor of Painting*
B.F.A. 1951, Illinois Wesleyan University

Benjamin Williams Smith, *Professor of Biochemistry*
B.S. 1940, Virginia Polytechnic Institute and State University; M.S. 1947, Ph.D. 1951, George Washington University

Bruce Hamilton Smith, *Professor of Pathology*
B.A. 1940, Syracuse University; M.D. 1943, State University of New York Upstate Medical Center

George Wilson Smith, *Assistant Professor of Education*
B.A. 1953, Central State College; Ed.M. 1965, Ed.D. 1971, University of Maryland

James Cecil Smith, Jr., *Special Lecturer in Biochemistry*
B.S. 1956, M.S. 1959, Ph.D. 1964, University of Maryland

Walton Edward Smith, *Associate Professor of Management Science*
B.S. 1960, M.S. 1962, University of Missouri—Columbia; D.Sc. 1972, George Washington University

William Arthur Smith, *Associate Professor of Mathematics*
B.A. 1941, M.A. 1947, Syracuse University

Sandra Joyce Smith-Gill, *Assistant Professor of Biology*
B.S. 1965, M.S. 1966, Ph.D. 1971, University of Michigan

Leivy Smolar, *Visiting Associate Professor of Religion*
B.A. 1957, New York University; M.A. 1958, Columbia University; B.H.L. 1959, M.A., Rabbi 1962, Hebrew Union College; Ph.D. 1973, University of Maryland

Richard Saxon Snell, *Professor of Anatomy and of Orthopaedic Surgery*
M.B., B.S. 1949, Ph.D. 1955, M.D. 1961, University of London

Jeanne Ellen Snodgrass, *Associate Professor of Human Kinetics and Leisure Studies*
B.A. 1952, Ohio Wesleyan University; M.S. in P.E. 1953, Smith College

Nancy Joan Shore Sobel, *Instructor in Special Education*
B.S. 1966, University of Michigan; M.A. in Ed. 1970, George Washington University

Israel Gregory Sohn, *Adjunct Professor of Geology*
B.S. 1935, City University of New York, City College; M.A. 1938, Columbia University; Ph.D 1965, Hebrew University

Henry Solomon, *Professor of Economics; Dean of the Graduate School of Arts and Sciences*
B.A. 1949, City University of New York, Brooklyn College; M.A. 1950, Ph.D. 1959, New York University

Irvin Murray Sopher, *Associate Professorial Lecturer in Forensic Sciences*
B.S. 1959, D.D.S. 1962, M.D. 1966, University of Maryland

David George Speck, *Assistant Professorial Lecturer in Education*
B.A. 1967, M.A. in Ed. 1968, Ed.D. 1973, George Washington University

Paul Eppley Spiegler, *Associate Professorial Lecturer in Biological Sciences*
B.S. 1956, University of Maryland; M.A. 1959, George Washington University

Mimi Spielberg, *Associate Clinical Professor of Psychology*
B.A. 1947, M.A. 1949, Ph.D. 1953, University of Nebraska

Michael Springer, *Assistant Professorial Lecturer in Public Administration*
B.A. 1963, Boston University

Charles Jay Stahl III, *Professorial Lecturer in Forensic Sciences*
B.S. 1952, Ursinus College; M.D. 1956, Thomas Jefferson University

Loretta May Stallings, *Professor of Human Kinetics and Leisure Studies*
B.A. 1947, Stanford University; M.A. 1950, University of the Pacific; Ed.D. 1965, University of Texas at Austin

George Stambuk, *Professor of International Affairs*
Abs.Jur. 1943, University of Zagreb; M.A. 1956, Ph.D. 1961, Indiana University at Bloomington

John Murry Starrels, *Assistant Professor of Political Science and International Affairs*
B.A. 1963, University of California, Berkeley; M.A. 1969, California State University, San Francisco; Ph.D. 1972, University of California, Santa Barbara

James Edward Starrs, *Professor of Law*
B.A., LL.B. 1958, St. John's University, New York; LL.M. 1959, New York University

Donald Eugene Starsinic, *Assistant Professorial Lecturer in Geography and Regional Science*
B.A. 1952, University of Pittsburgh; M.A. 1957, University of Chicago

Edwin Arthur Steane, *Assistant Professorial Lecturer in Physiology*
B.S. 1966, University of Wisconsin—Milwaukee; Ph.D. 1974, George Washington University

Edward Steers, Jr., *Professorial Lecturer in Biochemistry*
B.S. 1959, Ph.D. 1963, University of Pennsylvania

Carl Steiner, *Associate Professor of German*
B.A. 1958, M.A. 1962, Ph.D. 1966, George Washington University

George Steiner, *Professor of Music; Director of Orchestra*
B.S. 1938, Johns Hopkins University; Mus.B. 1938, Mus.M. 1940, Peabody Institute of Baltimore

Christopher Willie Sten, *Assistant Professor of English*
B.A. 1966, Carleton College; M.A. 1968, Ph.D. 1971, Indiana University at Bloomington

Richard Walton Stephens, *Professor of Sociology*
B.A. 1951, Franklin and Marshall College; M.A. 1953, Ph.D. 1956, University of North Carolina at Chapel Hill

Betsy Lee Hodges Sterman, *Lecturer in English*
B.A. 1953, Agnes Scott College; M.A. 1956, George Washington University

Edwin Lockwood Stevens, *Professor of Speech*
B.A. 1936, Rutgers University, New Brunswick; M.A. 1942, Columbia University

Charles Todd Stewart, Jr., *Professor of Economics*
B.A. 1946, M.A. 1948, Ph.D. 1954, George Washington University

Phyllis Langton Stewart, *Assistant Professor of Sociology*
B.A. 1961, M.A. 1962, California State University, Los Angeles; Ph.D. 1968, University of California, Los Angeles

Eugene Almon Stone, *Assistant Professor of Mathematics*
B.A. 1960, Vanderbilt University; Ph.D. 1966, University of Virginia

James Ashley Straw, *Associate Professor of Pharmacology*
B.S. 1958, Ph.D. 1963, University of Florida

Margaret Ann Strom, *Lecturer in English*
B.A. 1967, American University; M.A. 1970, University of Maryland

George Stuart, *Assistant Professorial Lecturer in Anthropology*
B.S. 1956, University of South Carolina; M.A. 1970, George Washington University

John Sanders Sullivan, *Clinical Instructor in Epidemiology and Environmental Health*

Theodore Suranyi-Unger, Jr., *Research Professor of Economics*
B.A. 1950, Syracuse University; Dr.rer.pol. 1957, University of Vienna

Earl Wilbur Sutherland III, *Assistant Professor of Health Care Sciences, of Medicine, of Pharmacology, and of Pathology (Laboratory Medicine)*
B.A. 1960, Ph.D., M.D. 1967, Case Western Reserve University

Sterling Scott Sutton, *Associate Professorial Lecturer in Economics*
B.A. 1952, M.A. 1956, University of Florida; M.A. 1964, Ph.D. 1968; George Washington University

Richard Switalski, *Research Instructor in Health Care Administration*
B.A. 1962, Miami University; M.S. 1964, Kent State University

Choy-Tak Taam, *Professor of Mathematics*
B.S. 1942, University of Illinois at Urbana-Champaign; M.A. 1943, Ph.D. 1945, Harvard University

Roland Henry Tanck, *Associate Research Professor of Psychology*
B.A. 1939, University of Wisconsin—Madison; M.A. 1948, Ph.D. 1956, George Washington University

Morton Frank Taragin, *Assistant Professor of Physics*
B.S. in Engr. 1965, M.Phil. 1969, Ph.D. 1970, George Washington University

Marvin Jacob Taves, *Professorial Lecturer in Health Care Administration*
B.A. 1945, Hamline University; Th.M. 1945, B.D. 1947, Bethel College, Minnesota; M.A. 1952, Ph.D. 1954, University of Minnesota

Theodore Walter Taylor, *Professorial Lecturer in Public Administration*
B.A. 1935, University of Arizona; M.A. 1936, Syracuse University; Ph.D. 1960, Harvard University

Thomas Clinton Teeples, *Assistant Professorial Lecturer in Statistics*
B.S. 1966, George Washington University

Geza Teleki, *Professor of Geology*
Ph.D. 1936, University of Vienna

Douglas Harold Teller, *Associate Professor of Design and Graphics*
B.A. 1956, Western Michigan University; M.F.A. 1962, George Washington University

Stanley Tesko, *Assistant Professorial Lecturer in Business Administration*
B.S. 1962, University of Maryland; M.S. in B.A. 1966, George Washington University

Alvin Thaler, *Professorial Lecturer in Mathematics*
B.A. 1969, Columbia University; Ph.D. 1966, Johns Hopkins University

Jean-François Marie Thibault, *Assistant Professor of French*
Baccalaureat 1960, Licence ès Lettre 1964, Diplôme d'Etudes 1965, Academie de Paris

Klaus Thoenelt, *Professor of German*
Staatsexamen 1956, Ph.D. 1961, University of Freiburg

Raymond Edward Thomas, *Associate Professor of Statistics; Director, University Computer Center*
B.A. 1955, M.A. 1957, M.Phil. 1971, George Washington University

*Irene Thompson, *Associate Professor of Russian*
B.S. 1965, M.S. 1969, Georgetown University

Ronald Bettes Thompson, *Professor of European History*
B.A. 1935, Yale University; Ph.D. 1954, University of Chicago

Donald David Thornton, *Assistant Professor of Physics*
B.A. 1963, State University of New York at Binghamton; M.S. 1966, Ph.D. 1968, Syracuse University

Richard Thornton, *Professor of History*
B.A. 1961, Colgate University; Ph.D. 1966, University of Washington

William Robert Throckmorton, *Assistant Professorial Lecturer in Sociology*
B.A. 1954, George Washington University

Charles Stanley Tidball, *Henry D. Fry Professor of Physiology and Research Professor of Medicine*
B.A. 1950, Wesleyan University; M.S. 1952, University of Rochester; Ph.D. 1955, University of Wisconsin—Madison; M.D. 1958, University of Chicago

Mary Elizabeth Tidball, *Professor of Physiology*
B.A. 1951, Mount Holyoke College; M.S. 1955, Ph.D. 1959, University of Wisconsin—Madison; Sc.D. 1973, Wilson College; Sc.D. 1974, Trinity College, District of Columbia

Neil Avrill Tilkens, *Associate Professor of Music*
Mus.B. 1950, Columbia Union College; Mus.M. 1952, Philadelphia Conservatory of Music

Rodney Tillman, *Professor of Education; Dean of the School of Education*
B.A. 1943, Henderson State College; M.A. 1949, Ed.D. 1955, Columbia University

Barbara Mills Timberlake, *Associate Professorial Lecturer in Biological Sciences*
B.S. 1952, George Washington University; M.A. 1955, Amherst College

Edwin Timbers, *Professor of Government and Business Relations*
B.A. 1944, West Virginia University; M.A. 1951, Ph.D. 1954, University of Michigan

George Todaro, *Adjunct Professor of Genetics*
B.A. 1958, Swarthmore College; M.D. 1963, New York University

Margaret Cooper Tolson, *Adjunct Assistant Professor of Music*
Mus.B. 1931, Mus.M. 1936, University of Rochester

William George Torpey, *Professorial Lecturer in Public Administration*
B.A., M.A. 1935, State University of New York at Albany; Ph.D. 1941, New York University

Carleton Raymond Treadwell, *Professor of Biochemistry*
B.A. 1934, Battle Creek College; M.S. 1935, Ph.D. 1939, University of Michigan

Charles Lawrence Trichilo, *Assistant Professorial Lecturer in Biochemistry*
B.A. 1968, M.Phil., Ph.D. 1971, George Washington University

Joseph Louis Tropea, *Assistant Professor of Sociology*
B.A. 1962, Wayne State University; M.A. 1965, Michigan State University; Ph.D. 1973, George Washington University

Philip True, *Associate Professorial Lecturer in Geography*
B.A. 1948, Western Michigan University; M.S. 1950, University of Chicago

Edward Byrd Truitt, Jr., *Research Professor of Pharmacology*
B.S. 1943, Medical College of Virginia of Virginia Commonwealth University; Ph.D. 1950, University of Maryland

Linda Albertson Tsantis, *Assistant Professor of Education*
B.A. 1965, M.A. 1970, Old Dominion University; Ed.D. 1974, George Washington University

James Michael Tubbs, *Assistant Professor of French*
B.A. 1962, M.A. 1969, University of Texas at Austin

Mortimer Darling Turner, *Associate Professorial Lecturer in Geology*
B.S. 1943, M.S. 1954, University of California, Berkeley; Ph.D. 1972, University of Kansas

William Lewis Turner, *Associate Professor of English*
B.A. 1934, M.A. 1941, Ph.D. 1952, University of Pennsylvania

* On sabbatical leave spring semester 1976.

Curtis Edward Tuthill, *Associate Professor of Psychology*
B.A. 1935, Macalester College; M.A. 1936, Ph.D. 1939, University of Iowa

Elinor Ulman, *Adjunct Assistant Professor of Art Therapy*
B.A. 1930, Wellesley College; B.S. 1943, Iowa State University of Science and Technology

George Vartkes Vahouny, *Professor of Biochemistry*
B.S. 1953, M.S. 1955, Ph.D. 1958, George Washington University

Peter B. Vaill, *Professor of Management Science; Dean of the School of Government and Business Administration*
B.A. 1958, University of Minnesota; M.B.A. 1960, D.B.A. 1964, Harvard University

Martin John Valaske, *Professor of Pathology*
Ph.B. 1950, M.D. 1954, Marquette University

Peter John Verhoven, *Associate Professorial Lecturer in Human Kinetics and Leisure Studies*
B.A. 1963, Morehead State University; M.S. 1965, D.Rec. 1969, Indiana University at Bloomington

Carlos Domingo Villa, *Assistant Professorial Lecturer in Management Science*
B.S. in I.E. 1966, M.S. in I.E. 1968, Ph.D. 1970, University of Florida

Robert Corbin Vincent, *Professor of Chemistry*
B.A. 1935, M.A. 1937, Ph.D. 1940, Cornell University

Clemmont Eyvind Vontress, *Professor of Education*
B.A. 1952, Kentucky State College; M.S. 1956, Ph.D. 1965, Indiana University at Bloomington

Jack Wright Waldrip, *Assistant Professor of Business Administration*
B.A. 1951, M.A. 1953, University of Tennessee, Knoxville; Ph.D. 1974, American University

Andrew Campbell Waldrop, *Assistant Professorial Lecturer in Business Administration*
B.A. 1961, Harvard University; M.B.A. 1972, University of Pennsylvania

Richard David Walk, *Professor of Psychology*
B.A. 1942, Princeton University; M.A. 1947, University of Iowa; M.A. 1949, Ph.D. 1951, Harvard University

Cynthia Walker, *Instructor in English*
B.A. 1970, Denison University; M.A. 1972, Ph.D. 1974, Purdue University

Glenn Anthony Walker, *Associate Professor of Biochemistry*
B.A. 1958, Bellarmine College; Ph.D. 1963, Michigan State University

Paul Ernest Walker, *Assistant Professorial Lecturer in Religion*
B.A. 1964, University of Utah; M.A. 1966, American University in Cairo; Ph.D. 1974, University of Chicago

Robert Harris Walker, Jr., *Professor of American Civilization*
B.S. 1945, Northwestern University; M.A. 1950, Columbia University; Ph.D. 1955, University of Pennsylvania

Dewey Wallace, Jr., *Professor of Religion*
B.A. 1957, Whitworth College; B.D. 1960, Princeton Theological Seminary; M.A. 1962, Ph.D. 1965, Princeton University

*Ruth Ann Wallace, *Associate Professor of Sociology*
B.A. 1961, Immaculate Heart College; M.A. 1963, University of Notre Dame; Ph.D. 1968, University of California, Berkeley

Irving Wallach, *Associate Professorial Lecturer in Forensic Sciences*
B.A. 1947, New York University; Ph.D. 1971, Columbia University

Regis Hills Walther, *Research Professor of Management Science*
B.A. 1941, University of California, Los Angeles; M.A. 1960, Ph.D. 1963, George Washington University

Christine Wang, *Clinical Instructor in Art Therapy*
B.A. 1954, Connecticut College

George Ching Yuan Wang, *Assistant Professor of Chinese*
B.A. 1951, Taiwan Normal University; M.S. 1955, Tokyo University of Education

Thomas Howard Wardlow, *Studio Lecturer in Applied Music (Percussion Instruments)*
B.S. 1962, M.S. 1964, University of Illinois at Urbana-Champaign

* On sabbatical leave fall semester 1975.

Martha Lou Ware, *Associate Professorial Lecturer in Education*
B.A. 1951, LL.B. 1953, University of Texas at Austin; M.A. in Ed. 1961, George Washington University

Don Wayne Watkins, *Associate Professor of Physiology*
B.Ch.E. 1963, University of Louisville; Ph.D. 1968, University of Wisconsin—Madison

Stephen Jay Wayne, *Associate Professor of Political Science and Public Affairs*
B.A. 1961, University of Rochester; M.A. 1963, Ph.D. 1968, Columbia University

Harry Weingarten, *Professorial Lecturer in Statistics*
B.A. 1943, City University of New York, City College; M.A. 1945, Columbia University; Ph.D. 1959, George Washington University

Robert Louis Weintraub, *Professor of Botany*
B.S. 1931, M.A. 1933, Ph.D. 1938, George Washington University

Edward Ronald Weismiller, *Professor of English*
B.A. 1938, Litt.D. 1953, Cornell College; M.A. 1942, Harvard University; D.Phil. (Oxon.) 1950, University of Oxford

Ira Paul Weiss, *Assistant Professorial Lecturer in Child Health and Development and in Physiology*
B.S. 1965, City University of New York, City College; Ph.D. 1969, Syracuse University

William Gaynor Wells, Jr., *Associate Professorial Lecturer in Business Administration*
B.S. 1947, University of Chicago; M.S. 1961, Purdue University

Martin Wender, *Associate Professorial Lecturer in Business Administration*
B.S. in B.A. 1941, Auburn University; M.B.A. 1951, Harvard University

Mario Werner, *Professor of Pathology (Laboratory Medicine); Director of the Division of Laboratory Medicine*
M.D. 1960, University of Zurich

Peter Werres, *Lecturer in German*
M.Phil. 1972, George Washington University

Richard Werth, *Assistant Professorial Lecturer in Mathematics*
B.S. 1941, M.A. 1942, Columbia University; M.A. 1944, Ohio State University

Harvey Robert Wertlieb, *Associate Professorial Lecturer in Health Care Administration*
B.A. 1961, M.B.A. 1964, George Washington University

Kathleen Shingler Weston, *Associate Professorial Lecturer in Anatomy*
B.A. 1929, Northern Michigan University; M.A. 1934, University of Michigan; M.D. 1951, Temple University

John Lee Westrate, *Professorial Lecturer in Public Administration*
B.A. 1944, Illinois College; M.A. 1949, Ph.D. 1963, University of Chicago

Briggs White, *Professorial Lecturer in Forensic Sciences*
B.A. 1932, D.C.L. 1965, Sterling College; M.A. 1936, Ph.D. 1940, University of Colorado

David Gover White, *Professor of Chemistry*
B.Ch.E. 1950, Cornell University; Ph.D. 1954, Harvard University

Jane Elizabeth White, *Studio Lecturer in Applied Music (Voice)*
Mus.B. 1950, University of Rochester; M.A. 1963, American University

Richard Otis White, *Studio Lecturer in Applied Music (Oboe)*
Mus.B. 1950, University of Rochester

Robert Lanon White, *Adjunct Assistant Professor of Health Care Administration*
B.S. 1964, U.S. Naval Postgraduate School; M.S. in Fin.Mgt. 1966, George Washington University; Ph.D. 1970, University of Iowa

Garland Dean Wiggs, *Associate Professor of Education*
B.B.A. 1956, University of Cincinnati; M.A. 1960, University of Northern Colorado; Ed.D. 1967, George Washington University

Earl Howard Williams, *Assistant Professorial Lecturer in Forensic Sciences*
B.A. 1949, Catholic University of America; M.A. in Ed. 1970, George Washington University

Marjorie Joan Williams, *Assistant Clinical Professor of Pathology*
M.D. 1943, University of Bristol

Robert Crumpton Willson, *Associate Professor of Journalism*
B.A. 1951, George Washington University

Lawrence Winkler, *Associate Professor of Education*
B.S. 1952, M.A. 1954, Washington University; Ed.D. 1965, George Washington University

Erik Kenelm Winslow, *Associate Professor of Behavioral Sciences*
B.S. 1963, Pennsylvania State University; M.S. 1965, Ph.D. 1967, Case Western Reserve University

Maida Rust Withers, *Associate Professor of Human Kinetics and Leisure Studies*
B.A. 1958, Brigham Young University; M.S. 1960, University of Utah

Marvin Milton Wofsey, *Professor of Management*
B.S. 1935, New York University; M.A. 1943 Ph.D 1967, American University

Thomas William Wolfe, *Professorial Lecturer in International Affairs*
B.A. 1935, Hiram College; M.A. 1950, Columbia University; Ph.D. 1955, Georgetown University

William Wolfgang Wolman, *Professorial Lecturer in Statistics*
B.B.A. 1946, City University of New York, City College; M.A. 1949, Columbia University; Ph.D. 1960, University of Rochester

Reuben Esselstyn Wood, *Professor of Chemistry*
B.S. 1936, Ph.D. 1939, California Institute of Technology; M.S. 1937, University of Chicago

John Woodburn, *Associate Professorial Lecturer in Education*
B.A. 1935, Marietta College; M.A. 1942, Ohio State University; Ph.D. 1952, Michigan State University

William Thomas Woodward, *Assistant Professor of Painting*
B.A. 1957, M.A. 1961, American University

Arthur Gilbert Wright, *Associate Professorial Lecturer in Anthropology*
B.A. 1932, Carthage College; M.S. 1947, University of Illinois at Urbana-Champaign

Frederick Wright, *Special Lecturer in Pathology*

John Franklin Wright, Jr., *Assistant Professor of Drawing and Graphics*
B.A. 1954, American University; M.A. 1960, University of Illinois at Urbana-Champaign

William Ralph Wright, *Studio Lecturer in Applied Music (Clarinet and Saxophone)*
Diploma 1951, Curtis Institute of Music; Mus.M. 1971, Catholic University of America

Jean Marie Gladding Wukovich, *Lecturer in English*
B.A. 1964, M.A. 1966, George Washington University

Mary Xiroyanni, *Assistant Professor of Classics*
B.A. 1964, University of Athens; Ph.D. 1972, University of Wisconsin—Madison

Helen Bates Yakobson, *Professor of Russian*
B.S. 1935, Harbin Law School, Manchuria

Kenneth Chi-Kun Yang, *Assistant Research Professor of Health Care Administration*
B.A. 1960, West Georgia College; B.A. in P.A. 1963, Taiwan Institute of Public Administration

Harry Elwood Yeide, Jr., *Professor of Religion; Assistant Dean of Columbian College of Arts and Sciences*
B.A. 1953, Williams College; B.D. 1957, Union Theological Seminary; Ph.D. 1966, Harvard University

John Edward Yellen, *Assistant Professorial Lecturer in Anthropology*
B.A. 1964, Hobart and William Smith Colleges; M.A. 1966, Ph.D. 1974, Harvard University

Anthony Marvin Yezer, *Assistant Professor of Economics*
B.S. 1966, Dartmouth College; M.S. 1967, London School of Economics and Political Science; Ph.D. 1974, Massachusetts Institute of Technology

Richard Yi-chang Yin, *Associate Professor of Economics*
LL.B. 1946, Fu Jen University, China; M.A. 1950, University of Denver; Ph.D. 1966, Columbia University

Malcolm Black Young, *Assistant Professorial Lecturer in Public Administration*
B.A. 1962, Wabash College; M.P.I.A. 1964, Ph.D. 1972, University of Pittsburgh

Robert Arthur Young, *Adjunct Associate Professor of International Affairs*
B.S. 1964, University of Pennsylvania; M.A. 1966, Ph.D. 1970, University of Southern California

Joanna Schneider Zangrando, *Visiting Assistant Professor of American Civilization*
B.A. 1961, M.A. 1963, Wayne State University; Ph.D. 1974, George Washington University

Meira Ellen Zedek, *Associate Clinical Professor of Psychology*
B.A. 1953, Hebrew University; M.A. 1954, Ph.D. 1958, Boston University

Eileen Rachel Zeitz, *Adjunct Assistant Professor of Sociology*
B.A. 1968, M.A. 1971, George Washington University

Jack Arnold Zeller, *Assistant Professor of Pathology (Laboratory Medicine)*
B.A. 1960, Columbia University; M.D. 1964, New York Medical College

Isidore Zietz, *Professorial Lecturer in Geology*
B.S. 1939, M.S. 1940, City University of New York, City College

James Gregory Zimmerly, *Professorial Lecturer in Forensic Sciences*
B.A. 1962, Gannon College; M.D. 1966, J.D. 1969, University of Maryland; M.P.H. 1968, Johns Hopkins University

Isaiah Morris Zimmerman, *Associate Clinical Professor of Psychology*
B.A. 1951, M.S.W. 1953, University of California, Berkeley; Ph.D. 1967, Catholic University of America

Lorenz Eugene Zimmerman, *Clinical Professor of Ophthalmology and of Ophthalmic Pathology*
B.A. 1943, M.D. 1945, George Washington University

John Edmund Ziolkowski, *Associate Professor of Classics*
B.A. 1958, Duke University; Ph.D. 1963, University of North Carolina at Chapel Hill

Thomas William Zito, Jr., *Assistant Professorial Lecturer in Journalism*
B.A. 1970, Georgetown University

Bernard Charles Zook, *Associate Professor of Pathology (Comparative)*
B.S. 1962, D.V.M. 1963, Colorado State University

Artley Joseph Zuchelli, *Professor of Physics*
B.A. 1955, Ph.D. 1958, University of Virginia

CONSULTANTS IN RESEARCH—GRADUATE SCHOOL OF ARTS AND SCIENCES

Anton Allen, *Chief, Comparative Pathology Section, Laboratory Aids Branch, Division of Research Services, National Institutes of Health;* Comparative Pathology
D.V.M. 1955, University of Georgia; Ph.D. 1961, University of Wisconsin—Madison

Elizabeth Potts Anderson, *Research Biochemist, Laboratory of Biochemistry, National Cancer Institute;* Metabolism of Purines and Pyrimidines
B.A. 1945, Sarah Lawrence College; M.S. 1947, University of Wisconsin—Madison; Ph.D. 1951, Stanford University

W. French Anderson, *Head, Section on Molecular Hematology, National Heart and Lung Institute;* Genetics
B.A. 1958, M.D. 1963, Harvard University; M.A. 1960, University of Cambridge

Franklyn Arnhoff, *Chief, Program Analysis Section, Training and Manpower Resources Branch, National Institute of Mental Health;* Experimental Psychology
B.S. 1948, Long Island University; M.A. 1949, New York University; Ph.D. 1953, Northwestern University

Julius Axelrod, *Chief, Section on Pharmacology, Laboratory of Clinical Science, National Institute of Mental Health;* Physiological Disposition of Drugs
B.S. 1933, City University of New York, City College; M.A. 1941, New York University; Ph.D. 1955, LL.D. 1971, George Washington University; Sc.D. 1966, University of Chicago

Jerry Laurens Barnard, *Curator, Division of Crustacea, U.S. National Museum of Natural History, Smithsonian Institution;* Crustacean Biology
B.A. 1949, M.S. 1950, Ph.D. 1953, University of Southern California

Ethel Joan Blanchette-Mackie, *Director, Electron Microscopy Laboratory, Section for Nutrition and Endocrinology, National Institute of Arthritis, Metabolism, and Digestive Diseases;* Biology of Lipids
B.S. 1956, City University of New York, Queens College; M.S. 1959, New York University; Ph.D. 1965, Columbia University

Leroy Blankenship, *Research Microbiologist, Dairy Foods Nutrition Laboratory, Nutrition Institute Agricultural Research Station, U.S. Department of Agriculture, Beltsville, Md.;* Microbial Physiology
B.S. 1954, M.S. 1961, Ph.D. 1963, University of Maryland

Roscoe Brady, Jr., *Chief, Section on Lipid Chemistry, Laboratory of Neurochemistry, National Institute of Neurological Diseases and Blindness;* Complex Lipids
B.S. 1943, Pennsylvania State University; M.D. 1947, Harvard University

Bernard Beryl Brodie, *Chief, Laboratory of Chemical Pharmacology, National Heart and Lung Institute;* Physiological Disposition of Drugs
B.S. 1931, McGill University; Ph.D. 1935, New York University

Arthur Brown, *Chief, Virology II Branch, Virus and Rickettsia Division, Biological Sciences Laboratory, Fort Detrick;* Virology
B.A. 1943, City University of New York, Brooklyn College; Ph.D. 1950, University of Chicago

Dean Burk, *Head, Cytochemistry Section, Laboratory of Biochemistry, National Cancer Institute;* Tissue Respiration in Biochemistry
B.S. 1923, Ph.D. 1927, University of California, Berkeley

Henry Marcellus Cathey, *Research Horticulturist, Crops Research Division, Plant Industry Station, U.S. Department of Agriculture;* Plant Physiology: Vascular Plants
B.S. 1950, North Carolina State University at Raleigh; M.S. 1952, Ph.D. 1955, Cornell University

Herman Cheville, *Head of Pathologic Investigations and Research Veterinarian, National Animal Disease Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Ames, Iowa;* Comparative Pathology
D.V.M. 1959, Iowa State University of Science and Technology; M.S. 1963, Ph.D. 1964, University of Wisconsin—Madison

Bruce Collette, *Assistant Director, Bureau of Commercial Fisheries, Systematics Laboratory, U.S. National Museum, Smithsonian Institution;* Biology of Fishes
B.S. 1956, Ph.D. 1960, Cornell University

Dominio Costa, *Chief, Laboratory of Preclinical Pharmacology, St. Elizabeths Hospital, National Institute of Mental Health;* Neuropharmacology
M.D. 1949, Universities of Padua and Cagliari

Gorgellin Datta, *National Coordinator of Head Start Evaluation, Office of Economic Opportunity;* Developmental Psychology
B.A. 1952, M.A. 1955, West Virginia University; M.A. 1957, Ph.D. 1961, Bryn Mawr College

Padma Rag Datta, *Research Biochemist, U.S. Food and Drug Administration;* Metabolism
B.S. 1946, Scottish Church College, Calcutta; M.S. 1951, University of Massachusetts, Amherst; Ph.D. 1956, West Virginia University

Arend de Vries, *Chief Economist, West Africa Region, International Bank for Reconstruction and Development;* Economic Development
M.S. 1946, University of Utrecht; Ph.D. 1951, Massachusetts Institute of Technology

Gerald Arthur Eddy, *Chief, Division of Virology, U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick;* Virology
B.S. 1953, D.V.M. 1955, Michigan State University; Ph.D. 1968, University of Notre Dame

José Manuel Espinosa, *Deputy Director, Office of Inter American Programs, U.S. Department of State;* Latin American History
B.A. 1930, M.A. 1931, Stanford University; Ph.D. 1934, University of California, Berkeley

Harold Finley, *Professor of Zoology, Howard University;* Protozoology
B.S. 1928, Morehouse College; M.S. 1929, Ph.D. 1942, University of Wisconsin—Madison

Alan Franklin, *Research Chemist, Physical Properties Section, Inorganic Materials Division, National Bureau of Standards;* Physical Chemistry of Solids
B.A. 1945, Ph.D. 1950, Princeton University

Victor Frattali, *Research Chemist, Naval Medical Research Institute, National Naval Medical Center;* Structure and Function of Enzymes
B.S. 1959, University of Scranton; Ph.D. 1965, Georgetown University

John Eric Fredland, *Professor of Economics, U.S. Naval Academy;* Public Finance
B.A. 1964 Harvard University; M.A. 1966, Ph.D. 1970, University of Michigan

Francois Naftali Frenkiel, *Physicist, Applied Physics Laboratory, Johns Hopkins University;* Theoretical Physics: Aerodynamics
Dip.M.E. 1933, Dip.Ae.E. 1937, University of Ghent, Ph.D. 1946, University of Lille

Robert Gibbs, Jr., *Chairman, Department of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution;* Vertebrate Zoology
B.A. 1951, Ph.D. 1955, Cornell University

Joseph Goldstein, *Assistant Professor of Metallurgy, Department of Metallurgy and Materials Science, Lehigh University;* Meteorite Study
B.S. 1960, M.S. 1962, D.Sc. 1964, Massachusetts Institute of Technology

James Granger, *Chief of Child Guidance Service and Director of Training, Walter Reed General Hospital;* Art Therapy
B.A. 1955, University of California, Berkeley; M.D. 1961, University of Rochester

Robert Edman Greenfield, Jr., *Head, Section on Tumor-Host Relations, National Cancer Institute;* Biochemistry of Cancer
B.S. 1942, Duke University; M.D. 1945, University of Illinois at the Medical Center; M.A. 19[illegible] University of California, Berkeley

Tibor Jack Greenwalt, *National Medical Director, American National Red Cross;* Cellular Physiology
B.A. 1934, M.D. 1937, New York University

Gordon Guroff, *Head, Section on Intermediary Metabolism, Laboratory of Biomedical Sciences, National Institute of Child Health and Human Development;* Amino Acid Metabolism
B.S. 1954, University of Illinois at Urbana-Champaign; M.S. 1956, Auburn University; Ph.D. 1959, University of Wisconsin—Madison

Edward Hacskaylo, *Plant Physiologist, Forest Physiology Laboratory, U.S. Department of Agriculture;* Mycology, Plant Physiology—Microorganisms
B.A. 1949, M.A. 1950, Ph.D. 1954, George Washington University

John Hardt, *Senior Specialist in Soviet Economics, Congressional Research Service, Economic Division, Library of Congress;* Soviet Economics, Comparative Economic Systems
B.A. 1945, M.A. 1948, University of Washington; M.A. 1950, Ph.D. 1955, Columbia University

Henry Field Haviland, Jr., *Senior Staff Member, Brookings Institution;* International Relations, especially American Foreign Policy
B.A. 1941, M.A. 1946, Ph.D. 1949, Harvard University

Joseph Ernest Hazel, *Research Geologist, Paleontology and Stratigraphy Branch, U.S. Geological Survey;* Paleontology
B.A. 1956, M.A. 1960, University of Missouri—Columbia; Ph.D. 1963, Louisiana State University and Agricultural and Mechanical College

Ronald Herberman, *Head, Cellular and Tumor Immunology Section, Laboratory of Cell Biology, National Cancer Institute;* Tumor Immunology
B.A. 1960, M.D. 1964, New York University

Edwin Leroy Hove, *Chief, Research Branch, Division of Nutrition, U.S. Food and Drug Administration;* Nutrition
B.A. 1936, M.S. 1937, Ph.D. 1939, University of Wisconsin—Madison

Francis Maurice Hueber, *Geologist-Paleobotanist, Smithsonian Institution:* Paleobotany
B.S. 1956, Butler University; M.S. 1959, Ph.D. 1960, Cornell University

Thelma Hunt, *Professor Emeritus of Psychology, in Residence;* Abnormal Psychology
B.A. 1924, M.A. 1925, Ph.D. 1927, M.D. 1935, George Washington University

William Jakoby, *Chief, Section on Enzymes and Cellular Biochemistry, National Institute of Arthritis, Metabolism, and Digestive Diseases;* Enzymology
B.S. 1950, City University of New York, Brooklyn College; Ph.D. 1953, Yale University

Kurt Jankowsky, *Associate Professor of German and Chairman of the Department of German, School of Languages and Linguistics, Georgetown University;* German Linguistics
Ph.D. 1956, University of Münster

Lent Clifton Johnson, *Chief, Bone and Joint Pathology, Armed Forces Institute of Pathology;* Histology
B.S. 1931, M.D. 1935, University of Chicago

Jack Colvard Jones, *Professor of Entomology, University of Maryland;* Insect Physiology
B.S. 1942, M.S. 1946, Auburn University; Ph.D. 1950, Iowa State University of Science and Technology

Meredith Leam Jones, *Curator, Division of Worms, U.S. National Museum, Smithsonian Institution;* Invertebrate Zoology
B.A. 1948, M.A. 1952, Ph.D. 1956, University of California, Berkeley

Robert Konrad Kahn, *Practicing Psychotherapist;* Psychotherapy
B.A. 1946, University of Pennsylvania; M.A. 1953, George Washington University; Ph.D. 1957, Pennsylvania State University

Meir Kende, *Head, Immunology Division, Cancer Chemotherapy Department, Microbiological Associates, Bethesda, Md.;* Immunology
M.S. 1960, Hebrew University; Ph.D. 1967, George Washington University

Milton Kern, *Research Chemist, National Institute of Arthritis, Metabolism and Digestive Diseases;* Protein Metabolism
B.S. 1949, City University of New York, Brooklyn College; Ph.D. 1954, Yale University

David Kohne, *Staff Member, Department of Terrestrial Magnetism, Biophysics Section, Carnegie Institution of Washington, D.C.;* Molecular Biology
B.A. 1960, Wabash College; Ph.D. 1965, Purdue University

Janos Ladik, *Visiting Scientist, Biophysics; Laboratory of Biophysical Chemistry, National Institute of Arthritis, Metabolism, and Digestive Diseases, Bethesda, Md.;* Physics
Chem. Engr. 1952, Technical University of Budapest; Doct. of Chem. Sciences 1971, Hungarian Academy of Sciences

Robert Land, *Chief, Division of General Reference and Bibliography, Library of Congress,* American Civilization: Library Research and Techniques
B.A. 1934, College of William and Mary; M.A. 1936, University of Virginia; B.S. in L.S 1940, Columbia University

Otto Landman, *Associate Professor of Biology, Georgetown University;* Microbial Genetics (Botany)
B.S. 1947, City University of New York, Queens College; M.S. 1948, Ph.D. 1951, Yale University

Marvin Seymour Legator, *Professor of Genetics, Brown University;* Genetic
B.A., M.S. 1948, Ph.D. 1951, University of Illinois at Urbana-Champaign

Elsie Lewis, *Associate Professor of History and Chairman of the Department of History, Howard University;* Negro History
B.A. 1932, Fisk University; M.A. 1933, University of Southern California; Ph.D. 1946, University of Chicago

Darrell Liu, *Acting Section Chief, Biochemistry of Microbial Structure, National Institute of Child Health and Human Development;* Peptides and Protein Structure
B.S. 1955, National Taiwan University; Ph.D. 1961, University of Pittsburgh

Walter McKay Lovenberg, *Section Chief, Biochemical Pharmacology, Experimental Therapeutics Branch, National Heart and Lung Institute;* Structure and Function of Proteins
B.S. 1956, M.S. 1958, Rutgers University; New Brunswick; Ph.D. 1962, George Washington University

Rose Mage, *Career Investigator, Laboratory of Immunology, National Institute of Allergy and Infectious Diseases;* Immunogenetics
B.S. 1956, Cornell University; Ph.D. 1963, Columbia University

Harriet Maling, *Head, Section on Physiology, Laboratory of Chemical Pharmacology, National Heart and Lung Institute;* Cardiovascular Pharmacology
B.A. 1940, Goucher College; M.A. 1941; Ph.D. 1944, Radcliffe College

Michael Joseph Malone, *Professor of Neurology and of Child Health and Development;* Brain Lipids
B.A. 1951, Boston College; M.D. 1956, Georgetown University

S. Branson Marley, Jr., *Chief, Serial Division, Library of Congress;* American Civilization: History of Journalism
B.A. 1937, University of North Carolina at Chapel Hill

George Reilly Martin, *Chief, Connective Tissue Section, Laboratory of Biochemistry, National Institute of Dental Research;* Connective Tissue
B.A. 1955, Colgate University; Ph.D. 1959, University of Rochester

Ladislaus Laszlo Marton, *Physicist, Atomic Physics, Electronics Division, National Bureau of Standards;* Electron Optics
Ph.D. 1924, University of Zurich

Donald Massaro, *Medical Investigator, Veterans Administration Hospital, District of Columbia;* Immunology
B.A. 1953, Hofstra University; M.D. 1957, George Washington University

Larry McGowan, *Associate Professor of Obstetrics and Gynecology;* Cytopathology
B.S. 1950, Millikin University; B.S. in Med. 1952, M.D. 1954, University of Illinois at Chicago Medical Center

Walter Mertz, *Biochemist Supervisor, Walter Reed Army Institute of Research* Intermediary Metabolism
M.D. 1951, University of Mainz

John Minna, *Head, Section on Somatic Cell Genetics, Laboratory of Biochemical Genetics, National Heart and Lung Institute;* Somatic Cell Genetics
B.A. 1963, M.A. 1967, Stanford University

Mortimer Mishkin, *Research Psychologist, Section on Neuropsychology, National Institute of Mental Health;* Experimental Psychology
B.A. 1946, Dartmouth College; M.A. 1949, Ph.D. 1951, McGill University

Arturo Morales-Carrion, *Director of Historical Research, University of Puerto Rico;* Latin American Studies
B.A. 1935, University of Puerto Rico; M.A. 1936, University of Texas at Austin; Ph.D. 1[illegible] Columbia University

Sean O'Reilly, *Professor of Neurology;* Neurochemistry
M.B. 1949, M.D. 1952, National University of Ireland

John Parker II, *Project Director and Virologist, Microbiological Associates, Inc., Bethesda, Md.;* Virology
B.S. 1957, M.S. 1961, Ph.D. 1965, University of Maryland

John Pisano, *Head, Section of Physiological Chemistry, Experimental Therapeutics Branch, National Heart and Lung Institute;* Physiological Chemistry
B.S. 1951, Pennsylvania State University; M.S. 1953, Ph.D. 1955, Rutgers University, New Brunswick

Christopher Polge, *Principal Scientific Officer, Agricultural Research Council of Great Britain, Unit of Reproductive Physiology and Biochemistry, University of Cambridge, England;* Embryonic Development
B.S. 1946, University of Reading; Ph.D. 1955, University of London

Michael Potter, *Head, Immunochemistry Section, Laboratory of Cell Biology, National Cancer Institute;* Immunology
B.A. 1945, Princeton University; M.D. 1949, University of Virginia

Herbert Rabin, *Head, Radiation Effects Section, Optical Materials Branch, Optical Physics Division, U.S. Naval Research Laboratory;* Solid State Physics
B.S. 1950, University of Wisconsin—Madison; M.S. 1951, University of Illinois at Urbana-Champaign; Ph.D. 1959, University of Maryland

Marco Rabinovitz, *Research Chemist, National Cancer Institute;* Protein Metabolism
B.A. 1956, Ph.D. 1961, University of California, Berkeley

David Platt Rall, *Associate Scientific Director for Experimental Therapeutics, National Cancer Institute;* Cancer Chemotherapy
B.A. 1946, North Central College; M.S. 1948, M.D., Ph.D. 1951, Northwestern University

Allen Raskin, *Research Psychologist, Psychopharmacology Research Branch, National Institute of Mental Health;* Psychopharmacology
B.A. 1949, Syracuse University; M.S., Ph.D. 1954, University of Illinois at Urbana-Champaign

Darrell Robinson, *Chief, Veterinary Pathology Division, Armed Forces Division, Armed Forces Institute of Pathology, Walter Reed Army Medical Center;* Veterinary Pathology
B.S. 1950, M.S., D.V.M. 1958, Kansas State University; Ph.D. 1965, Texas Agricultural and Mechanical University

Carl Romney, *Deputy Technical Director, U.S. Air Force Technical Applications Center;* Geophysics
B.S. 1945, California Institute of Technology; Ph.D. 1956, University of California, Berkeley

Jack Rosenbluth, *Associate Professor of Physiology, New York University;* Invertebrate Zoology
B.A. 1952, Columbia University; M.D. 1956, New York University

Philip Russell, *Director, Division of Communicable Disease and Immunology, and Chief, Department of Virus Diseases, Walter Reed Army Institute of Research;* Virology
B.A. 1954, Johns Hopkins University; M.D. 1958, University of Rochester

Sandras Sandor, *Associate Professor, Department of German and Russian, Howard University;* 20th Century German Literature
B.A. 1956, Szeged University, Hungary; B.Litt. 1961, University of Oxford; Ph.D. 1967, University of Southern California

Padman Sarma, *Head, Ecology and Epizoology Section, Viral Carcinogenesis Branch, National Cancer Institute;* Virology
D.V.M. 1953, Madras Veterinary College; M.S. 1957, Ph.D. 1959, University of Minnesota

Leonard Peter Schultz, *Curator of Fishes, U.S. National Museum, Smithsonian Institution;* Vertebrate Zoology, Ichthyology
B.A. 1924, Albion College; M.S. 1926, University of Michigan; Ph.D. 1932, University of Washington

David Bytovetzski Scott, *Chief, Laboratory of Histology and Pathology, National Institute of Dental Research;* Cytology
B.A. 1939, Brown University; D.D.S. 1943, University of Maryland; M.S. 1944, University of Rochester

Jarvis Edwin Seegmiller, *Clinical Investigator, National Institute of Arthritis, Metabolism, and Digestive Diseases;* Intermediary Metabolism
B.A. 1942, University of Utah; M.D. 1948, University of Chicago

Alexis Shelokov, *Chief, Laboratory of Virology and Rickettsiology, Division of Biologics Standards, National Institutes of Health;* Virology
B.A. 1943, M.D. 1948, Stanford University

Walter Allen Shropshire, Jr., *Assistant Director, Radiation Biology Laboratory, Smithsonian Institution;* Photobiology, Cell Physiology
B.S. 1954, M.S. 1956, Ph.D. 1958, George Washington University

Robert Sumner Sigafoos, *Botanist, U.S. Geological Survey;* Plant Ecology
B.S. 1942, M.S. 1943, Ohio State University; M.A. 1949, Ph.D. 1951, Harvard University

Harold Kenneth Skramstad, Jr., *Special Assistant to the Director, National Museum of History and Technology, Smithsonian Institution;* Material Aspects of American Civilization
B.A. 1963, M.Phil. 1969, Ph.D. 1971, George Washington University

Lyman Bradford Smith, *Senior Botanist, Department of Botany, Smithsonian Institution;* Plant Taxonomy
B.A. 1925, M.A. 1928, Ph.D. 1930, Harvard University

Leon Sokoloff, *Chief, Section on Rheumatic Diseases, Laboratory of Experimental Pathology, National Institute of Arthritis, Metabolism, and Digestive Diseases;* Collagen and Biosynthesis
B.A. 1938, M.D. 1944, New York University

Helmuth Sprinz, *Chief, Department of Experimental Pathology, Walter Reed Army Institute of Research;* Electron Microscopy
M.D. 1936, University of Berlin

Donald Fleming Squires, *Director, Marine Sciences Research Center, State University of New York at Stony Brook;* Biology of Coelenterates
B.A. 1950, Ph.D. 1955, Cornell University; M.A. 1952, University of Kansas

Bruno Friedrich Steinbruckner, *Associate Professor of Languages and Linguistics, American University;* 20th Century German Literature
Teacher's Certificate 1960, Teacher's Training College, Linz, Austria; Ph.D. 1965, University of Innsbruck

Robert Stern, *Medical Officer, National Cancer Institute;* Cell Biochemistry
B.A. 1957, Harvard University; M.D. 1962, University of Washington

Russell Bradford Stevens, *Executive Secretary, Division of Biology and Agriculture, National Research Council;* Mycology
B.S. 1937, University of Virginia; Ph.D. 1940, University of Wisconsin—Madison

Robert Stewart, *Horticulturist, Vegetable and Ornamentals Research Branch, Crops Research Division, Plant Industry Station, U.S. Department of Agriculture;* Cytogenetics
B.A. 1939, University of South Dakota; M.S. 1942, Ph.D. 1946, University of Maryland

Sarah Stewart, *Medical Director, Human Virus Leukemia Section, National Cancer Institute;* Viral Leukemia
B.S. 1927, New Mexico State University; M.S. 1930, University of Massachusetts, Amherst; Ph.D. 1939, University of Chicago; M.D. 1949, Georgetown University

Thomas Dale Stewart, *Emeritus Physical Anthropologist, Department of Anthropology, Smithsonian Institution;* Physical Anthropology
B.A. 1927, George Washington University; M.D. 1931, Johns Hopkins University

Kenneth Kanama Takemoto, *U.S. Public Health Service Officer, National Institute of Allergy and Infectious Diseases;* Virology
B.S. 1949, M.S. 1950, Ph.D. 1953, George Washington University

John Thomas, *Research Associate, Institute for Behavioral Research;* Experimental Psychology
M.A. 1962, Ph.D. 1965, University of Maryland

Lawrence John Tilly, *Research Scientist, Savannah River Laboratory, Division of Radiological and Environmental Sciences, Aiken, S.C.;* Ecology
B.S. 1952, Elmhurst College; M.S. 1953, University of Illinois at Urbana-Champaign; Ph.D. 1965 University of Iowa

Robert C.Y. Ting, *Scientific Director, Biotech Research Laboratories, Rockville, Md.;* Virology
B.A. 1954, M.A. 1956, Amherst College; Ph.D. 1960, University of Illinois

Douglass Tormey, *Senior Investigator, National Cancer Institute;* Cell Physiology
B.S. 1960, M.S., M.D. 1964, Ph.D. 1969, University of Wisconsin-Madison

Anastasios Johannes Tousimis, *Director of Research, Biodynamics Research Corporation, Inc.;* Biophysics
B.S. 1950, M.S. 1952, University of Pittsburgh; Ph.D. 1963, George Washington University

William Wirsing Tullner, Jr., *Chief, Section on Endocrinology, Reproduction Research Branch, National Institute of Child Health and Human Development;* Endocrinology, Metabolism
B.A. 1937, Temple University; M.S. 1953, Ph.D. 1957, George Washington University

Norman Ture, *Consultant in Economics;* Public Finance
M.A. 1947, Ph.D. 1968, University of Chicago

Ernest Umberger, formerly *Chief, Division of Drug Biology, Bureau of Drugs, U.S. Food and Drug Administration;* Endocrine Physiology
B.S. 1937, M.A. 1941, George Washington University; Ph.D. 1948, Georgetown University

Srikrishna Vadlamudi, *Chief, Cancer Chemotherapy Research, Microbiological Associates, Inc., Bethesda, Md.;* Cancer Chemotherapy, Immunology
M.S. 1959, Ph.D. 1962, University of Wisconsin—Madison

John Van Buren, *Acting Chief, Branch of Surgical Neurology, National Institute of Neurological Diseases and Blindness;* Functional Anatomy of the Thalmus
B.A. 1943, Dartmouth College; M.D. 1947, Columbia University; M.S. 1950, McGill University; Ph.D. 1961, George Washington University

Richard Veech, *Medical Officer, Section on Neurochemistry, Division of Special Mental Health, National Institute of Mental Health;* Neurochemistry and Enzymes and Coenzymes
B.A. 1957, M.D. 1962, Harvard University; Ph.D. 1968, Oxford University

Robert Vogel, *Curator, Division of Mechanical and Civil Engineering, Smithsonian Institution;* American Civilization: History of Technology
B.Arch. 1954, University of Michigan

Ludwig von Sallmann, *Chief, Ophthalmology Branch, National Institute of Neurological Diseases and Blindness;* Neuro-ophthalmology
M.D. 1919, University of Vienna

Wilcomb Edward Washburn, *Director, Office of American Studies, Smithsonian Institution;* American Civilization
B.A. 1948, Dartmouth College; Ph.D. 1955, Harvard University

Marion Webster, *Research Biochemist, Laboratory of Experimental Therapeutics, National Heart and Lung Institute;* Metabolism
B.S. 1942, Florida State University; M.S. 1947, Ph.D. 1950, Georgetown University

Hans Weil-Malherbe, *Chief, Section on Neurochemistry, Division of Special Mental Health Research, National Institute of Mental Health;* Neurochemistry
M.D. 1929, University of Heidelberg; M.S. 1940, D.Sc. 1945, University of Durham

Herbert Weissbach, *Associate Director and Head of the Department of Biochemistry, Roche Institute of Molecular Biology;* Vitamins
B.S. 1953, City University of New York, City College; M.S. 1955, Ph.D. 1957, George Washington University

Ruth Wittler, *Research Microbiologist and Chief of the Mycoplasma Research Section of the Department of Bacterial Diseases, Walter Reed Army Institute of Research;* Microbiology: Mycoplasma
B.A. 1940, Oberlin College; M.S. 1944, Johns Hopkins University; Ph.D. 1947, Case Western Reserve University

Myron Lee Wolbarsht, *Professor of Ophthalmology and Physiology, Duke University;* Visual Research
B.A. 1950, St. John's College, Maryland; Ph.D. 1958, Johns Hopkins University

Oktay Yenal, *Chief, Public and Private Finance Division, International Bank for Reconstruction and Development;* Economics and Turkish Economy
B.A. 1951, Robert College, Istanbul; B.Sc. 1955, London School of Economics; Ph.D. 1958, Istanbul University

Ralph Aubrey Young, *Consultant, International Monetary Fund;* International Finance
B.A. 1923, Ohio Wesleyan University; M.B.A. 1925, Northwestern University; Ph.D. 1930, University of Pennsylvania

Lorenz Eugene Zimmerman, *Clinical Professor of Ophthalmic Pathology and of Ophthalmology;* Ophthalmic Pathology
B.A. 1943, M.D. 1945, George Washington University

FIELD OF STUDIES CONSULTANTS—GRADUATE SCHOOL OF ARTS AND SCIENCES

Robert Allen, *Soviet Area Specialist, Library of Congress;* American Civilization: U.S. and Russian Institutions in Social Change
Ed.B. 1943, Southern Illinois University, M.A. 1945, Ph.D. 1950, Yale University

Wallace Bowman, *Specialist in Environmental Policy and Assistant Chief of the Environmental Policy Division, Congressional Research Service, Library of Congress;* American Civilization: Man, Nature, and Environment
B.A. 1949, M.A. 1953, Washington University; M.S. 1956, Yale University

Cary Carson, *Coordinator of Research and Architectural Historian, St. Mary's City Commission (Maryland);* American Civilization: Vernacular Architecture
B.A. 1963, Carleton College; M.A. 1965, University of Delaware

Grose Evans, *Curator, Loans and Exhibitions, National Gallery of Art;* American Civilization: English Art History
B.F.A. 1941, M.A. 1942, Ohio State University; Ph.D. 1953, Johns Hopkins University

Alan Fern, *Assistant Chief, Prints and Photographs Division, Library of Congress;* American Civilization: American and European Cinema
B.A. 1950, M.A. 1954, Ph.D. 1960, University of Chicago

Joseph Fulton, *Specialist in Labor Economics and Relations, Congressional Research Service, Library of Congress;* American Civilization: Labor History
B.A. 1946, M.A. 1948, New York University

Frederick Richmond Goff, formerly *Chief, Rare Book Division, Reference Department, Library of Congress;* American Civilization: History of Printing and the Book
B.A. 1937, M.A. 1939, Litt.D. 1965, Brown University

Alan Jabbour, *Director, Folk Arts Division, National Endowment for the Arts;* American Civilization: Folk Music
B.A. 1963, University of Miami; M.A. 1966, Ph.D. 1968, Duke University

John Bennett Kuiper, *Head, Motion Picture Section Division, Prints and Photographs; Library of Congress;* American Civilization: Mass Media (Movies and Television)
B.A. 1950, University of Kentucky; M.A. 1957, Ph.D. 1960, University of Iowa

Philip Lundeberg, *Curator, Division of Naval History, Smithsonian Institution;* American Civilization: Military and Naval History
B.A. 1944, M.A. 1947, Duke University; Ph.D. 1954, Harvard University

Vernon McKay, *Professor of African Studies, School for Advanced International Studies, Johns Hopkins University;* African History
B.A. 1933, Baker University; M.A. 1934, Syracuse University; Ph.D. 1939, Cornell University

Robert Sauer, *Chief, Department of Pathology, National Zoological Park, Smithsonian Institution;* Comparative Pathology
D.V.M. 1952, University of Pennsylvania

Julian Wood Witherell, *Head, African Section, Library of Congress;* American Civilization: African History
B.A. 1956, Bowdoin College; M.A. 1958, Ph.D. 1964, University of Wisconsin—Madison

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate* and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs†

* The University Senate has been renamed the Faculty Senate.
† The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

of The George Washington University as soon after order is restored as is practicably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968*:

The George Washington University is opposed to discrimination based on race, color, creed, sex, or national origin. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

* Amended January 18, 1973.

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established with the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.*

* The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and should be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the College

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE AND HEALTH SCIENCES, Admissions Office, School of Medicine and Health Sciences

SUMMER SESSIONS CATALOGUE, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL (Preregistration Edition, Revised Edition) AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSESS SUMMER SESSIONS, Dean of the Summer Sessions

A

Abbreviations, key to, 200
Absence, regulations concerning, *see* Attendance
Academic advising centers, 75
Academic organizations, student, 62
Academic work load:
  Columbian College, 72
  Division of University Students, 183
  Graduate School of Arts and Sciences, 99
  School of Education, 107
  Schoolof Government and Business Administration, 138, 147, 160
  School of Public and International Affairs, 167
Academic status of the University, 12
Accounting:
  B.B.A. degree requirements, 138-42, 201
  Courses, 202-5
  Department, 201-5
  Doctoral study, 158-62
  M.B.A. field of concentration, 151,201
  Practice internship, 142, 203
Accreditation, 12
Achievement tests, 24, 72, 77, 78, 137, 183, 299, 341
Activities, student, 60-66
Adaptive physical education, M.A. in Ed. specialization 125, 132, 352
Administration:
  Bachelor of Science in, 135, 163
  Ed.S. field in, 128
  Master of Science in, 135, 146, 163
  Officers of, 16-18
Administration and curriculum, Ed.D. field, 128
Administration of long-term care facilities, M.A. in H.C.A. concentration, 157
Administration of science and technology, M.B.A. field of concentration, 151
Administrative justice, center for, 192-93
Admission, 21-28
  Early admission plan, 22
  For students from foreign institutions, 26-28
  Graduate, 25, *see also* school concerned
  Readmission, 26
Admission (cont'd.):
  Transfer students, 22
  Undergraduate, 21-24
  University Students, Division of, 25, 182-83
  With advanced placement, 23-24, 75, 137-38, 249
  With advanced standing, 23, 78, 126, 137, 140
Adult education:
  Ed.D. field, 129
  Ed.S. field, 128
  In the College of General Studies, 12
  In the Division of University Students, 181-85
  M.A. in Ed. field, 125, 126
Advanced placement test, 23-24, 78, 137, 261, 262, 299, 341
Advanced standing, 23-24, 78, 126, 137, 140
Advising centers, academic, 76
Advisory system, Columbian College, 75
Advocate groups, student, 65
Algebra, graduate courses, 380
Alumni association, 55
Alumni career services, 60
American art, M.A. concentration, 223
American civilization:
  Courses, 207-11
  Degree programs in, 206-7
American literature:
  Courses, 306-7
  Degree programs in, 298-99
American college testing program, 72, 137
American religious history, Ph.D. field, 445
American Studies program, 205-11
  Council, 205-6
  Degree programs, 206-7
  Faculty advisory committee, 205
Anatomic pathology, M.S. field, 400
Anatomy department, 211-14
  Courses, 211-14
  Ph.D. degree program, 211
Analysis, graduate courses, 381-84
Anthropology department, 214-21
  Courses, 215-21
  Degree programs, 214-15
  Departmental prerequisite, 215

Apartments, Munson Hall, 57
Appendix, recently established regulations, 554-56
Application:
Fee, 21, 31
Fee for room reservation, 31, 57
For graduate admission, 21, 25, 26-28, 93, 146-47, 159, 173-74, 179, 182
For graduation, 31, 50, 95
For undergraduate admission, 21-24, 26-28
Applied economics, M.B.A. field of concentration, 153
Applied mathematics:
Degree programs, 374-75
Graduate courses, 384-87
Applied music, degree programs, 392-93
Applied statistics, degree programs, 488-89
Apprenticeships in urban affairs, 172-73, 422
Art department, 221-34
Courses, 225-34
Art department (cont'd.):
Degree programs, 222-25
Departmental prerequisite, 229
Art exhibits, 65
Art history:
Courses, 225-28
Degree programs, 222-25
Special honors, 222
Art teaching field, 111-12
Art Therapy, graduate study and courses, 234-36
Arts and sciences, Council of, 69-70
Arts and sciences, graduate school, *see* Graduate School of Arts and Sciences
Arts and sciences, undergraduate college, *see* Columbian College of Arts and Sciences
Assistantships, 36-37
Astronomy courses, 409
Athletics, 65
Attendance, 45, 50, 73, 136, 166
Auditing, 33, 48, 184
Awards, 41-45
Awards for graduate study, sponsored, 39

B

Bachelor's degrees, *see* Degrees
Balance sheet, 49
Behavioral sciences in organization development, M.B.A. field of concentration, 151
Biochemistry department, 236-39
Courses, 237-39
Degree programs, 236-37
Biological Sciences department, 239-49
Courses, 240-49
Degree programs, 239-40
Departmental prerequisite, 240
Biology:
Courses, 240-44
Degree programs, 239-40
Teaching field, 112
Biomedical and related sciences, master's and doctoral fields, 97
Biometric laboratory, 196
Board of Trustees of the University, 13-15
Botany:
Courses, 244-46
Degree programs, 239-40
Business Administration:
Bachelor's degree requirements, 138-45
Courses, 249-59
Department, 249-59
Doctoral study, 159-62
Master's degree requirements, 147-54
Business-government relations, M.B.A. field of concentration, 151-52

C

Calendar for 1975-76, 5-7
Career services, student and alumni, 60
Center for administrative justice, 192-93
Center for manpower policy studies, 196
Ceramics, M.F.A. field, 224
Certificate, Health Care Administration, 158-59
Certification for teachers, 132
Certification of public purchasing agents, 163
Changes in program of studies, 48, 185
Chemistry department, 259-65
Courses, 261-65
Degree programs, 259-61
Graduate placement examination, 261
Chemistry teaching field, 112-13

Chinese courses, 270-72
Chinese language and literature, Bachelor of Arts degree program, 81, 170, 270
Chorus and orchestra concert series, 65
Classical archaeology and anthropology, Bachelor's degree program, 214, 223
Classical archaeology, classics, and history, M.A. field, 224, 266, 340
Classical archaeology and classics, Bachelor's degree program, 223, 266
Classical art and archaeology, M.A. concentration, 223
Classical humanities, Bachelor's degree program, 266
Classics and classical archaeology, Bachelor's degree program, 223, 266
Classics department, 265-69
  Courses, 266-69
  Degree programs, 266
Classification of students, Columbian College, 75
College entrance examination board tests, 23-24, 72, 77, 137, 183, 299, 341
College-level examination program (CLEP), 23-24, 78-79, 140
College student development, M.A. in Ed. field, 122
Colleges, schools, and divisions of the University, 11-12, 67-188
Colloquia, interuniversity, 180, 426
Columbian College of Arts and Sciences, 67-89
  Academic advising centers, 76
  Academic standing, 74
  Academic work load, 72
  Advisory system, 75
  Associate in Arts degree, 83
  Bachelor's degrees, 84-89
  Committees, 61-62, 68-69
  Council of arts and sciences, 69-70
  Dean's council, 68
  Dean's list, 73
  Declaration of major, 76
  Departmental majors, 88-89
  Departmental, special examinations, 78-79
  Double majors, 70, 89
  Entrance requirements, 71-72
  Faculty, 67-68
  Field of study major, 87-88
  General course requirements, 76-77
  Honors, 73
  Interdisciplinary programs, 89
  Preprofessional requirements, 79-83
  Regulations, 72-75
Columbian College of Arts and Sciences (cont'd.):
  Sophomore honors program, 73
  Sophomore year in Paris program, 71
  Undergraduate major, 87-89
Commencement, *see* Graduation
Committees:
  Joint, faculty and students, 61
  Of the board of trustees, 15-16
  Of the University, 18-20, 61-62
  On the judicial system, 61
  See also college or school concerned
Communications organizations, student, 64
Composition, Mus.M. field, 393
Comprehensive health planning, M.A. in H.C.A. concentration, 157
Computer center, University, 54-55
Computer science:
  B.A., B.S. degree requirements, 488-89
  Graduate courses, 387-88
Concerts, 65
Conduct, 50, 51, 554-56
Conducting, Mus.M. field, 393
Consortium of universities, 29, 52-53
Consultants:
  Field of studies, 552-53
  In research, 544-52
Contemporary art, M.A. concentration, 223
Continuing education for women, 55
Continuing education in health care administration, 162
Continuing student, 29
Continuous registration, 31, 49, 94
Convocation, *see* Graduation
Cooperative programs, 103-104
Correspondence courses, 75, 140, 169
Council of arts and sciences, 69-70
Counseling center, 59
Counseling, generic, M.A. in Ed. field, 125
Counseling, guidance and, M.A. in Ed. field, 125
Counselor education:
  Ed.D. field, 129
  Ed.S. field, 128
Course numbers, explanation of, 78, 199-200
Courses offerings, time of, 200
Courses of instruction, 199-501
Credit, 48
  Balance sheet, 49
  By examination, 23-24
  Earned through U.S. Armed Forces Institute, 24

Credit (cont'd):
Explanation of amount of, 200-201
For advanced placement examination, 24
For college entrance examination board college-level examination program (CLEP), 23-24, 78-79, 140
For Columbian College special departmental examination, 24, 78-79
For professional courses, granted by Columbian College, 78
For service school courses, 24
For summer school work, 49
From other institutions, 23, 99, 100-101, 126, 137, 150, 154, 159
Maximum allowed in Columbian College for experimental humanities/service-learning program, 78
Repeating courses for, 48, 94, 184
Transfer of, within the University, 48, 99, 100-101, 175, 185
Credit/no credit option, 85, 110, 139, 169, 184
Criminal justice, graduate study, 313
Crisis-resource teaching, M.A. in Ed. specialization, 126
Cultural exchange organizations, student, 63
Curriculum:
Ed.S. field, 128
M.A. in Ed. field, 125

Dance:
B.S. in H.K.L.S. specialization, 122
M.A. in Ed. specialization, 125, 352
Dean of Students, office of, 56
Dean's council:
Columbian College of Arts and Sciences, 68-69
Division of University Students, 181
Graduate School of Arts and Sciences, 91
School of Education, 105
School of Government and Business Administration, 133
School of Public and International Affairs, 164
Dean's honor list, School of Government and Business Administration, 138
Dean's honor list, School of Public and International Affairs, 167
Dean's list, Columbian College, 73
Declaration of major, Columbian College of Arts and Sciences, 76
Deferred payment plans for parents, 33
Degree programs, colleges and schools, 11-12
Degrees:
Associate in Arts, 83
Associate in Arts in General Studies, 71
Bachelor of Arts:
In Education, 80-81, 110-22
Offered by Columbian College, 77, 83-89
Offered by the School of Public and International Affairs, 81-83, 166-73
Bachelor of Business Administration, 136-45
Bachelor of General Studies, 71
Bachelor of Science:
In Administration, 135, 159
In Geodetic and Cartographic Science, 71
In Health Care Administration, 11, 135, 159, 334
In Human Kinetics and Leisure Studies, 80-81, 108-10, 122-24
In Medical Technology, 400
In Oceanography, 71
Offered by Columbian College, 77, 83-89
Combined Bachelor of Arts and Doctor of Medicine, 87
Combined Master of Arts and Juris Doctor, 179
Combined Master of Science and Doctor of Medicine, 97
Doctor of Business Administration, 159-62
Doctor of Education, 128-31
Doctor of Philosophy, 93-98, 100-102
Doctor of Public Administration, 159-62
Dual Program for Doctor of Medicine and Doctor of Philosophy, 97-98
Education Specialist, 128
Master of Arts:
In Education, 125-27
In Government, 146-50, 156
In Health Care Administration, 146-50, 157-58

Degrees (cont'd.):
In Special Studies, 95, 104, 215, 224, 405, 500
In Teaching, 124-25
Offered by the Graduate School of Arts and Sciences, 93-102
Offered by the School of Public and International Affairs, 173-79
Master of Business Administration, 146-54, 162-63
Master of Fine Arts, 93-96, 98-100, 224, 481
Master of Forsenic Sciences, 92-97, 98-100, 312-13
Master of Music, 93-96, 98-100, 393
Master of Philosophy, 101
Master of Public Administration, 146-50, 154-55
Master of Science:
For Teachers, 93-97, 98-100, 375
In Administration, 135, 146, 163
In Forsenic Science, 93-97, 98-100, 313
In International Affairs, 165, 180, 443-44
In Special Studies, 95, 104, 313
Offered by the Graduate School of Arts and Sciences, 93-100
Degrees (cont'd.):
Master of Urban and Regional Planning, 146-50, 155-56
Departmental honors, 51
Departmental majors, Columbian College, 88-89
Departmental organizations, student, 62
Design, M.F.A. field, 224
Diagnostic-prescriptive teaching, M.A. in Ed. specialization, 126
Dishonesty, regulations concerning, 46
Dismissal of students, 46, 51, 554-56
Dissertation requirements, 50, 101-102, 130, 161
Distinction, degrees earned with 50-51
Division of Experimental Programs, *see* Experimental Programs, Division of
Division of University Students, *see* University Students, Division of
Divisional organizations, student, 62
Doctor of Medicine, combined degree programs, 87, 97-98
Doctoral degrees, *see* Degrees
Dormitories, 56-57
Drama, *see* Speech and Drama department
Drama and speech, teaching field, 119-20
Dramatic art, degree programs, 479-80
Dropping courses, 48, 136, 183, 185

E

Early admission plan, 22
Early childhood education:
B.A. in Ed. area of certification, 121
M.A. in Ed. field, 125
Early childhood special education, M.A. in Ed. specialization, 125
Earth science teaching field, 113
East Asia, graduate study and research on, 179-80
East Asian Languages and Literatures department and courses, 269-72
East Asian Studies (China and Japan), bachelor's degree program, 82, 165, 171
Eastern Europe, graduate study and research on, 179-80
Economics department, 272-80
Courses, 273-80
Degree programs, 272-73
Departmental prerequisite, 273
Economics group option, B.A. field in public affairs, 172
Economics specialization, B.B.A. degree, 143-44
Education department, 280-97
Courses, 281-97
Departmental prerequisite, 281, 284, 296
Special methods courses, 281, 283
Education Policy:
Courses, 297-98
Graduate study, 297
Education, School of, 105-32
Academic work load, 107
Committees, 105-6
Dean's council, 105
Degree requirements:
B.A. in Ed. 80, 108-22
B.S. in H.K.L.S., 80-81, 108-10, 122-24
Ed.D., 124, 128-32
Ed.S., 124, 128
M.A. in Ed., 124, 125-27
M.A.T., 124-25

Education, School of (cont'd.):
Entrance requirements:
Bachelor's degrees, 108-9
Ed D., 129
Ed.S., 128
M.A. in Ed.,125
M.A.T., 124-25
Faculty, 105
Historical development, 106
Scholarship requirements, 109, 127, 128
Special programs and services, 131-32
Teaching fields, 110-20
Education, special, *see* Special Education department
Educational leadership, institute for, 194-95, 197
Educational objectives, 10, *see also* college, school, or division concerned
Educational opportunity program, 58
Educational resources information center (ERIC) clearinghouse on higher education, 196
Elementary administration:
Ed.S. field, 128
M.A. in Ed. field, 125
Elementary education:
M.A. in Ed. field, 125
Professional courses, B.A. in Ed. degree, 121
Teaching field, 113
Elementary school human kinetics and leisure studies:
B.S. in H.K.L.S. specialization, 122
M.A. in Ed. specialization, 125, 352
Emeriti faculty, 502-5
Employed students' academic work load, 72, 107, 138, 147, 183
Employment, student, 40, 60
Engineering and Applied Science, School of, 11 (*See School of Engineering and Applied Science* catalogue)
English:
Composition courses, 300-302
Correct use of, 73, 139-40, 169
Literature courses, 302-7
Literature, degree programs, 298-99
Placement examination, 24, 77, 299-300
Requirement, 76
Teaching field, 114
Test of, as a foreign language, 26-28, 93
English department, 298-307
Courses, 300-307
Degree programs, 298-99
English department (cont'd.):
Department prerequisite, 300
Special honors, 298, 304, 307
Entrance requirements, see college, school, or division concerned
Environmental Studies:
Course, 309
Undergraduate study, 308-9
Ethnographic conservation, graduate study, 215, 224
Examinations, 47
Admission test for graduate study in business, 147, 159
Advanced placement tests, 23-24
American college testing program, 72, 137
College entrance examination board, 23-24, 72, 137, 183, 284
College-level examination program (CLEP), 23-24, 78-79, 140
Columbian College departmental special, 24, 78-79
Comprehensive, for Ed.D. degree, 130
Comprehensive, for Ed.S. degree, 128
English as a foreign language, 26-27, 93
Final, in defense of dissertation, 101-2, 131, 161-62
For admission, 26-27, 72, 137, 183
For placement in language courses, 24, 77
For placement in mathematics courses, 77
For qualifying for advanced standing or waiving curriculum requirements, 23-24, 78, 137, 299, 341
Foreign language, for doctoral study, 100, 180
Foreign language, for Master's candidacy, 99, 175
General, for D.B.A. and D.P.A. candidates, 160-61
General, for Ph.D. candidates, 100, 101, 102
Graduate placement in chemistry, 261
Graduate record, 93, 102-3, 128, 147, 159, 173, 224, 266, 340, 431, 467, 480
Major, in Columbian College, 88
Major field, for Ed.D. candidates, 130
Management tool, for D.B.A. and D.P.A. candidates, 160
Master's comprehensive, 100, 127, 148, 175
Miller analogies test, 128, 147, 431
National teacher, 31, 50, 110-11

Examinations (cont'd.):
Oral, for Ed.S. degree, 128
Oral, in defense of dissertation, 101-2, 130, 161-62
Physical, 31, 59
Scholastic aptitude, 72, 137, 183
Supporting field, for Ed.D. candidates, 130
Tool requirement:
For doctoral study, 100-101, 160
For Master's candidacy, 99, 175
Exceptional children, education of teachers of, 131
Exchange organizations, international and cultural, 63
Experimental Humanities:
Columbian College regulation concerning, 78
Courses, 309-12
Service-Learning courses, 311-12
Experimental Programs, Division of, 186-87
Associates, 187
Steering committee, 187

F

Faculty, alphabetical list, 502-44
Fees, 29-34
Counseling center, 59
Food service rates, 57
Payment of, 32-33
Projected tuition increases, 31-32
Reading center, 53-54
Residence hall rates, 57
Speech and hearing clinic, 53
Fellowships, 37-39, 102-3, 134
Field-of-study majors, Columbian College, 86-87
Field of studies consultants, 552-53
Finance and investments, M.B.A. field of concentration, 153
Finance specialization, B.B.A. degree, 144
Financial aid, 32, 34-41, 58
For foreign students, 40
For graduate students, 37-40, 102-3
For undergraduate students, 34-37
Law enforcement education program, 41
Loans, 33-35, 39-40
Prepaid and deferred payment plans for parents, 33
Student employment, 40
Financial encumbrance, for nonpayment of fees, 31, 33-34
Financial regulations, 32-34
Fine arts:
Courses, 229-34
Degree programs, 222-23, 224
Special honors, 223
Folger Institute for Renaissance and 18th Century Studies, cooperative program, 103-4, 305, 349-50, 454-55
Food service, 57
Foreign language examination:
For doctoral study, 101, 180
For Master's candidacy, 99, 175
Placement, 24, 77
Foreign language requirement, 77, 81-82, 99-100, 101, 170-71, 173, 175, 177-78, 180
Foreign students, 59
Admission, 26-28
Courses for, 300
Financial aid, 40
Forensic Sciences department, 312-16
Courses, 313-16
Master's degree programs, 312-13
Fraternities, social, 64
French:
Courses, 451-55
Degree programs, 450
Examinations:
For doctoral study, 101
For Master's candidacy, 99-100, 175
Placement, 24, 450
Teaching field, 114-15

G

General alumni association, 55
General examination:
For D.B.A. and D.P.A. candidates, 160-61
For Ph.D. candidates, 100, 101, 102
General Studies, Associate in Arts and Bachelor's degrees in, 71
General science teaching field, 115
Generic counseling, M.A. in Ed. field, 125

Genetics:
Courses, 317-19
Graduate study, 317
Geochemistry, degree programs, 260, 325
Geodetic and Cartographic Science, Bachelor of Science degree in, 71
Geography and Regional Science department, 319-24
Courses, 320-24
Degree programs, 320
Geography specialization, M.A. in Ed. degree, 320
Geography teaching field, 115
Geology department, 324-30
Courses, 325-30
Degree programs, 324-25
Teaching field in earth science, 113
German courses, 331-33
German teaching field, 116
Germanic Languages and Literatures department, 330-34
Courses, 331-34
Degree programs, 330
Examinations:
For doctoral study, 101
For Master's candidacy, 99-100, 175
Placement, 24, 330
Government and Business Administration, School of, 133-63
Academic work load, 138
Accounting practice internship, 142
Committees, 133-34
Dean's council, 133
Dean's honor list, 138
Degree requirements:
B.B.A. 136-45
Doctoral study, 156-58
M.A. in Govt. 147-50, 156-57
M.A. in H.C.A. 147-50, 157-58
M.B.A., 147-54
M.P.A., 147-50, 154-55
M. of Urb. and Reg. Plan., 147-50; 155-56
Post-Master's Grad. Cert. in H.C.A., 158-59
Entrance requirements:
Bachelor's study, 136-37
Doctoral study, 159
Government and Business Administration, School of (cont'd.):
Master's study, 146-47
Faculty, 133
Fellowships, 134
Objectives, 134-35
Off-campus degree programs, 135, 146, 163
Regulations, 136
Scholarship requirements, 138-39, 148
Special programs, 162
Government management intern scholarship program, 162
Government of the University, 13
Grades, 46, 93-94, 124, 148, 176, 184
Graduate record examination, 93, 102-3, 128, 147, 159, 173, 224, 266, 340, 431, 464, 480
Graduate School of Arts and Sciences, 90-104
Academic work load, 99, 100
Admissions requirements, 93
Consultants in research, 91-92
Cooperative programs, 103-4
Dean's Council, 91
Degree programs, 95-104
Doctoral degree requirements, 93-95, 97-98, 100-102
Master's degree requirements, 93-95, 97, 98-100
Faculty, 90-91
Fellowships and financial aid, 102-3
Field of studies consultants, 92
History and organization, 92
Off-campus degree programs, 104
Postdoctoral study, 102
Regulations, 93-95
Graduation:
Application for, 50, 95
Dates, *see* University calendar
Fees, 31, 95
Requirements, 49, 95
Grants, 37, 38, 58
Graphics, M.F.A. field, 218
Greek courses, 255-56
Groups, special interest and advocate, 65
Guidance and counseling, M.A. in Ed. field, 125

H

Health and accident insurance, 59
Health Care Administration:
B.S. in H.C.A. degree, 12, 135, 334
Health Care Administration (cont'd.):
Continuing education program, 162
Courses, 334-39

Health Care Administration (cont'd.):
Department, 334-39
International institute, 163
M.A. in H.C.A. degree requirements, 147-50, 157-58
M.B.A. field of concentration, 152
Post-Master's Grad. Cert. requirements, 158-59
Health information systems, M.A. in H.C.A. concentration, 158
Health service, student, 58-59
Health staff seminar, 193, 197
Hebrew:
Courses, 269
Placement examination, 24
Higher education:
Ed.D. field, 129
Ed.S. field, 128
M.A. in Ed. field, 125
History:
Of religions—Hinduism—, M.A., field in, 445
Of the University, 9-10
Teaching field, 116-17
History department, 339-51
Courses, 341-51
Degree programs, 340-41
Departmental prerequisite, 341, 346, 349
Honors program, 340, 346
Waiver examinations for first-group courses, 24, 341
Hobbies, student organizations for, 65
Holidays, *see* University calendar
Home study courses, 75, 140, 169
Honor societies, student, 63
Honorary trustees of the University, 15
Honors, 50-51
Honors program, sophomore, Columbian College, 73, 351
Courses, 351
Honors program, History department, 340, 346
Honors program, secondary school, 185
Honors, special, 51, 222, 298, 304, 307, 418
Hospital administration, M.A. in H.C.A. concentration, 158
Hours of instruction, 199
Housing, 56-57
Human Ecology, doctoral study, 351
Human Kinetics and Leisure studies, Bachelor's degree requirements, 80-81, 108-10, 122-24
Human Kinetics and Leisure Studies, M.A. in Ed. field, 125
Human Kinetics and Leisure Studies, department and courses, 351-60
Human resource development, M.A. in Ed. field, 125, 126
Humanities, Experimental, courses, 309-12
Humanities, Master's and doctoral fields, 96

I

Incomplete/authorized withdrawal, explanation of, 46
Incomplete, removal of, 75, 93-94, 110, 124, 138, 148, 168, 176, 184
Independent study plan, 136
Information processing specialization, B.B.A. degree, 144
Information systems technology, M.B.A. field of concentration, 152
Institute for educational leadership, 194-95, 197
Institute for management science and engineering, 197
Institute for Sino-Soviet studies, 179-80
Courses, 361-62
Members of the Institute, 360
Insurance, health and accident, 59
Interdisciplinary programs, Columbian College, 89
International Affairs:
B.A. degree program, 82, 166-70, 171-72
M.A. degree program, 173-77
M.S. war college program, 180
Courses, 443-44
School of Public and, 164-80
International and cultural exchange organizations, 63
International business:
B.B.A. degree specialization, 144
M.B.A. field of concentration, 153
International communications, international economics, international politics, group options, B.A. field in international affairs, 171
International institute for health care administration, 163
International relations, doctoral study in, 93-95, 100-102, 179-80, 362

International students, 59
Internships, 38-39, 125, 142, 194, 203, 215, 291, 293, 365, 421, 475, 476, 478
Interuniversity research colloquia, 180, 426
Italian courses, 455
Italian placement examination, 450

J

Japanese course, 272
Joint committee of faculty and students, 61
Journalism department, 363-66
  Courses, 363-66
  Degree program, 363
  Departmental prerequisite, 363
Judaic studies, committee and undergraduate study, 366
Judicial system, committee on the, 61

L

Language placement examination, 24, 77
  see also department concerned
Language requirement, Columbian College majors, 77
Latin:
  Courses, 266-68
  Placement examination, 24
  Undergraduate major, 266
Latin American studies, 367
  Courses, 367
  Graduate study, 173-76, 177
  Undergraduate study, 367
Law enforcement education program, 41
Leave, military, 49
Leave of absence, 95, 131, 162
Liberal arts graduate school, *see* Graduate School of Arts and Sciences
Liberal arts undergraduate college, *see* Columbian College of Arts and Sciences
Libraries, 13
Library of Congress, cooperative program in American civilization, 103, 207, 209-10
Library regulations, 51
Loans, 33-35, 39-40, *see also* Law enforcement education program
Location of the University, 13
Logic, graduate courses, 388
Long-term care facilities, administration of, M.A. in H.C.A. concentration, 157
Lost and found office, 52

M

Major, declaration of, Columbian College of Arts and Sciences, 76
Major field examination for Ed.D. candidates, 130
Major fields in Columbian College, 86-87
Major quality-point index, 138
Management science department and courses, 367-73
Management science and engineering, institute for, 197
Manpower policy studies, center for, 196
Marketing, M.B.A. field of concentration 153
Marketing specialization, B.B.A. degree, 144-45
Marvin, Cloyd Heck, Center, 58
Master's comprehensive examinations, 100, 127, 148, 175
Master's degrees, *see* Degrees
Mathematical sciences, Master's and doctoral fields, 96-97
Mathematical statistics, degree programs, 488-89
Mathematics department, 373-89
  Courses, 375-89
  Degree programs, 374-75
  Joint graduate degree program with area universities, 379-89
  Placement examination, 77
Mathematics teaching field, 117
Meals, 57
Medical services, 58-59

Medicine and Health Sciences, School of, 11, 87, 97-98
Microbiology department, 390-92
  Courses, 390-92
  Degree programs, 390
Mid-east regional resource center, 197
Mid-semester warning, 74
Military leave, 49
Miller analogies test, 128, 147, 431
Munson Hall apartments, 57
Museum education, M.A.T. program, 124-25
Museum training, M.A. concentration, 103, 223-24
Music composition, Mus.M. field, 393
Music department, 392-99
  Courses:
    Applied, 396-99
    History and literature, 394-95
    Theory, 395-96
  Degree programs, 392-93
Music history and literature, Bachelor's degree program, 392-93
Music teaching field, 117-18
Music theory, degree programs, 392-93
Musicology, Master's degree program, 393
Mycology, graduate study, 399

N

National Bureau of Standards, cooperative program, 104
National Law Center, 11
National teacher examinations, 31, 50, 110-11
Natural resources policy center, 197-98
Navy graduate financial management program, 162
Ninety-hour program, Bachelor's degree:
  Columbian College, 86
  School of Public and International Affairs, 169-70
Nominating board, student, 62
Nondegree status, 25, 181-85

O

Objectives of the University, 10, *see also* college or school concerned
Oceanography, Bachelor of Science in, 71
Off-campus degree programs, 12, 71, 104, 132, 135, 146, 163, 180
Officers of administration of the University, 16-18
Operations research and systems analysis, M.B.A. field of concentration, 153
Oral examination, in defense of dissertation, 101-2, 130, 161-62
Orchestra and chorus concert series, 65
Organizations, student, 62-65

P

Painting, M.F.A. field, 224
Paris, sophomore year program in, 71
Pathology department, 399-402
  Courses, 401-2
  Degree programs, 400
Performing arts, student organizations in the, 64
Personnel management, degree requirements:
  B.B.A. degree, specialization, 145
  M.B.A. field of concentration, 154
Pharmacology department, 402-5
  Courses, 402-5
  Degree programs, 402
Phi Beta Kappa, 63
Philosophy and social policy, graduate study in, 405-6
Philosophy department, 405-8
  Courses, 406-8
  Degree programs, 405-6
Photography, M.F.A. field, 224
Physical examination, 31, 59
Physical science course, 261
Physical sciences, Master's and doctoral fields, 96-97
Physician's assistant program, 11
Physics department, 408-14
  Courses, 409-14
  Degree program, 409
  Departmental prerequisite, 409

Physics teaching field, 118
Physiology department, 414-17
Courses, 415-17
Degree programs, 414
Departmental prerequisite, 415
Placement examination, graduate, in chemistry, 261
Placement tests, 23-24, 77, 261
Policy on release of student information, 52
Policy studies and special projects, 189-95
Policy studies in science and technology, program of, 189-92
Advisory committee, 192
Professional staff, 190-92
Polish course, 463
Political organizations, student, 64
Political Science department, 417-29
Courses, 419-29
Degree programs, 417-18
Departmental prerequisite, 419
Service-learning courses, 429
Special honors, 418
Politics group option, B.A. field in public affairs, 172
Portuguese course, 456
Postdoctoral study, 102
Premedical curriculum, 79
Prepaid and deferred payment plans for parents, 33
Prizes, 41-45
Probation, 74, 109, 139, 168, 184
Procurement and contracting, M.B.A. field of concentration, 154
Professional coures, regulations concerning, Columbian College, 78
Professional organizations, student, 64
Program board, 62
Program board series, 65
Program of policy studies in science and technology, 189-92
Programs, right to make changes in, 51
Property responsibility, 52

Q

Quality-point index, 47, 107, 127, 138
Major, Q.P.I., 138

R

Reading center, 53-54
Reading, M.A. in Ed. field, 126
Readmission, 26, 93, 174
Proseminar in the major, Columbian College, 88
Psychology department, 430-39
Courses, 431-39
Degree programs, 430-31
Departmental prerequisite, 431
Public Administration:
Courses, 439-43
Department, 439-43
Doctoral study, 159-62
M.P.A. degree requirements, 147-50, 154-55
Public Affairs:
B.A. degree requirements, 82-83, 166-70, 172
M.A. degree requirements, 174-76, 178
Public and International Affairs, School of, 164-80
Academic standing, 167
Academic work load, 167
Committees, 164-65
Dean's Council, 164
Dean's honor list, 167
Degree requirements:
For Bachelor's study, 167-73
For Master's study, 174-79
Entrance requirements:
For Bachelor's study, 167
For Master's study, 173-74
Faculty, 164
Institute for Sino-Soviet studies, 179-80
Objectives, 165-66
Regulations, 166
Scholarship requirements, 167-68, 176
Staff of instruction, 443
Study abroad, 169, 170, 171
War college program, 180
Courses, 443-44
Public purchasing agents, certification of, 163
Publications and communications, student, 64
Readmitted student, 28
Recreation program, 66
Recreational organizations, student, 65

Refunds, 33-34
Regional study group option, B.A. field in international affairs, 172
Registration, 28-29
Regulations, 45-52, 554-56, *see also* Financial regulations, and college, school, or division concerned
Rehabilitation counseling, M.A. in Ed. field, 126, 131
Release of student information, University policy on, 52
Religion department, 444-50
  Courses, 445-50
  Degree programs, 444-45
Religion and medical care, M.A. field, 444-45
Religions, history of—Hinduism, M.A. field, 445
Religious education, M.A. field, 444
Religious life, 60
Religious organizations, student, 64
Renaissance and baroque art, M.A. concentration, 223
Research:
  Consultants in, 544-52
  Programs, 103-4
  Sponsored, 196-98
Residence halls, 56-57
Residence requirements, 50
  Columbian College:
    For the Associate's degree, 83
    For the Bachelor's degrees, 84
  Graduate School of Arts and Sciences:
    For the Master's degrees, 98, 100
    For the Ph.D. degree, 102
  School of Education:
    For the Bachelor's degrees, 109
    For the Ed.D. degree, 131
Residence requirements (cont'd.):
  For the Ed.S. degree, 128
  For the M.A. in Ed. degree, 127
  School of Government and Business Administration:
    For the B.B.A. degree, 139
    For the Doctor's degrees, 158
    For the Master's degrees, 150, 154, 157
    For the Post-Master's Grad. Cert. in H.C.A., 159
    School of Public and International Affairs:
      For the B.A. degree, 168
      For the M.A. degree, 174-75
Romance Languages and Literatures department, 450-60
  Courses, 451-60
  Degree programs, 450
  Departmental prerequisite, 451, 456
  Examinations:
    For doctoral study, 101
    For Master's candidacy, 98, 175
    Placement, 24, 450
Rules of the University, right to change, 52
Russia, graduate study and research on, 179-80
Russian:
  Courses, 463-67
  Degree programs, 462-63
  Examinations:
    For doctoral study, 101
    For Master's candidacy, 98, 175
  Placement, 24, 463
  Teaching field, 118-19
Russian studies, Master's degree program, 173-76, 178

S

Sanskrit courses, 333
Scandinavian courses, 333-34
Scholarship, 46-47, 50, *see also* college, school, or division concerned
Scholarships:
  For foreign students, 40
  Graduate, 37-40
  Undergraduate, 34-37
Scholastic aptitude tests, 72, 137, 183
School organizations, student, 62
Science and technology, policy studies in, 189-92
Science, technology, and public policy, Master's degree program, 174-76, 178
Sculpture, M.F.A. field, 224
Secondary administration:
  Ed.S. field, 128
  M.A. in Ed. field, 126
Secondary education:
  M.A. in Ed. field, 126
  Professional courses, B.A. in Ed. degree, 120-21
Secondary school honors program,

econdary school physical education:
B.S. in H.K.L.S. specialization, 122-24, 352
M.A. in Ed. specialization, 125, 352
emester hours, explanation of, 200-201
enate, faculty, 20
erbo-Croatian course, 464
ervice-learning program, 186, 460-61
Columbian College regulation concerning, 78
ervice organizations, student, 64
ervice school courses, credit for, 24
igma Xi, 63
ino-Soviet studies:
Courses, 360-62
Institute for, 179-80
lavic Languages and Literatures department, 462-67
Courses, 463-67
Degree programs, 462-63
Placement examination, 24, 463
mithsonian Institution, cooperative program in American civilization, 103, 207, 210-11
ocial fraternities, 64
ocial sciences, Master's and doctoral fields, 96
ocial sororities, 65
ocial studies teaching field, 119
ocial r .search group, 198
ociology department, 467-74
Courses, 468-74
Degree programs, 467-68
Departmental prerequisite, 468
ophomore honors, program, Columbian College, 73, 351
ophomore year in Paris program, 71
orities, social, 65
oviet Union, graduate study and research on, 179-80
anish:
Courses, 456-60
Degree programs, 450
Departmental prerequisite, 456
Examinations:
For doctoral study, 101
For Master's candidacy, 98, 175
Placement, 24, 450
Teaching field, 119
anish American literature, degree programs, 450
ecial Education:
A. in Ed. area of certification, 121-22
Special Education (cont'd.):
Courses, 474-79
Department, 474-79
Ed.D. field, 129
Mid-east regional resource center, 197
M.A. in Ed. field, 126
Special honors, 51, 222, 298, 304, 307, 418
Special interest and advocate groups, student, 65
Special studies, Master's degree programs, 95, 104, 215, 224, 405, 500
Speech and Drama department, 479-88
Courses, 481-88
Degree programs, 480-81
Speech communication, Bachelor's degree program, 480
Speech and drama teaching field, 119-20
Speech and hearing clinic, 53
Speech pathology and audiology, degree programs, 480-81
Sponsored research, 196-98
Sports, 65
Staff of instruction, alphabetical list, 502-53
Statistics department, 488-96
Courses, 490-96
Degree programs, 488-89
Departmental prerequisite, 489
Statistics specialization, B.B.A. degree, 145
Student Activities, 60-66
Office, 60-61
Student career services, 60
Student employment, 40, 60
Student health service, 58-59
Student information, University policy on release of, 52
Student life, 56-66
Student nominating board, 62
Student organizations, 62-65
Student publications and communications, 64
Student services, 56-60
Students, classification of, Columbian College, 75
Students, joint committee of faculty and, 61
Study abroad, 71, 169, 170, 171
Summer school credit, 49
Summer session, 188
Supervision and human relations, M.A. in Ed. field, 126
Suspension, 46, 47, 74, 109, 139, 168, 184, 554-56

T

Teacher education, Ed.D. field, 129
Teaching, Master of Arts in, 124-25
Teaching fields, Education, 110-20
Teachers, certification for, 132
Tests, *see* Examinations
Textile Museum, cooperative program, 103, 215, 224
Theatrical productions, 66
Therapeutic recreation, M.A. in Ed. specialization, 125, 131, 352
Thesis, not required in optional Master's program, 98, 126-27, 150, 174
Thesis requirements, 50, 100, 127, 149, 175, 176
Time of course offerings, 201
Tool requirements:
  For doctoral study, 101
  For Master's candidacy, 98, 175
Topology, graduate courses, 388-89
Tourism development, M.A. in Ed. specialization, 125, 352
Traineeships, 38-39
Transcripts of record, 31, 49
Transfer students, admission, 22
Transfer within the University, 48, 99, 100-101, 126, 185
Transportation and logistics specialization, B.B.A. degree, 145
Trustees:
  Board of, 14-15
  Committees of the Board of, 15-16
Tuition, 29-30
  Advanced deposit, 23, 31
  Projected increases, 31-32
Tutorial study, 85

U

University Center fee, 30
  Projected increase, 32
University Students, Division of, 181-85
  Academic work load, 183
  Dean's council, 181
  Entrance requirements, 182-83
  Regulations, 183-85
  Scholarship requirements, 183-85
  Secondary school honors program, 185
Urban Affairs, B.A. field, 83, 172-73
Urban Affairs group option, B.A. field in public affairs, 172
Urban and Regional Planning:
  Courses, 497-99
  Department, 496-99
  M. of Urb. and Reg. Plan. degree requirements, 146-50, 155-56
Urban recreation and parks, M.A. in Ed. specialization, 125, 352

V

Veterans education, 54
Vocational counseling, 59

W

Waiver examinations, 23-24, 31, 78, 137, 299, 341
War college program, 180
  Courses, 443-44
Warning, mid-semester, 74
Withdrawal, 33-34, 46, 47-48, 95, 138, 168, 184
Women Studies, courses and graduate study, 499-501
Work load, *see* Academic work load

Z

Zoology courses, 246-49
Zoology degree programs, 239-40

OLLEGES AND SCHOOLS—DEGREE PROGRAMS

LUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart. Sc.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

RADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.Forens.S.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers), Master of Science in Forensic Science (M.S. in Forens.S.), Master of Science in Special Studies (M.S. in Sp. Std.), and Doctor of Philosophy (Ph.D.)

CHOOL OF MEDICINE AND HEALTH SCIENCES: Associate in Science (A.S.), Bachelor of Science (B.S.), Bachelor of Science in Medical Technology (B.S. in Med. Tech.), and Doctor of Medicine (M.D.)

ATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L. (Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

CHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Engineering Administration (M.E.A.), Master of Science (M.S.), and Doctor of Science (D.Sc.)

CHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor of Science in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master of Arts in Education (M.A. in Ed.), Master of Arts in Teaching (M.A.T.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

CHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A.), Bachelor of Science in Administration (B.S. in Adm.), Bachelor of Science in Health Care Administration (B.S. in H.C.A.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A.)

CHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.) and Master of Arts (M.A.), Master of Science in International Affairs (M.S.I.A.)

-William Byrd—75M

THE GEORGE WASHINGTON UNIVERSITY

COLUMBIAN COLLEGE OF ARTS AND SCIENCES, 1821

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE AND HEALTH SCIENCES, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

THE DIVISION OF UNIVERSITY STUDENTS, 1930

THE COLLEGE OF GENERAL STUDIES, 1950

THE SUMMER SESSIONS, 1916

THE UNIVERSITY HOSPITAL, 1898

THE DIVISION OF EXPERIMENTAL PROGRAMS, 1973

THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, D.C. 20052

THE GEORGE WASHINGTON UNIVERSITY BULLETIN

Vol. LXXIV, No. 7, June, 1975



SCHOOL OF MEDICINE AND HEALTH SCIENCES

1975-1976



THE GEORGE WASHINGTON UNIVERSITY CAMPUS / WASHINGTON, D.C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
Volume LXXIV, No. 7, June, 1975

Published by The University at Washington, D.C. 20052
MONTHLY: DECEMBER AND JUNE
(2 ISSUES IN MAY, 3 ISSUES IN MARCH, JULY)

Second Class Postage Paid at Washington, D. C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN

THE SCHOOL OF MEDICINE AND HEALTH SCIENCES 1975–1976

WASHINGTON, D.C. 20037



CONTENTS

Page

4 Calendar of the School of Medicine and Health Sciences
5 The University
7 The Board of Trustees
8 Officers of Administration
9 The School of Medicine and Health Sciences
11 Regulations
12 Student Affairs
15 Facilities
18 Affiliated Hospitals
22 Committees
24 Alumni and Allied Associations
26 The Doctor of Medicine Degree Program
42 Undergraduate Degree Programs in Allied Health Sciences
68 Required or Recommended Courses in Allied Health Programs Offered in Other Divisions of the University
76 Courses of Instruction
78 Anatomy
81 Anesthesiology
83 Biochemistry
86 Child Health and Development
90 Clinical Engineering
91 Dermatology
92 Health Care Sciences
100 Interdisciplinary Courses
101 Medical and Public Affairs
102 Medicine
112 Microbiology
116 Neurological Surgery
117 Neurology
118 Obstetrics and Gynecology
120 Ophthalmology
121 Orthopaedic Surgery
122 Otolaryngology
123 Pathology
129 Pharmacology
132 Physiology
135 Psychiatry and Behavioral Sciences
139 Radiology
146 Surgery
149 Urology
150 Faculty and Staff of Instruction of the School of Medicine and Health Sciences
236 Assistants in Research and Instruction
242 Medical Student Record
241 Appendix: Recently Established Regulations
245 Index

THE CALENDAR 1975–76*

AUGUST 1975

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SEPTEMBER 1975

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

OCTOBER 1975

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

NOVEMBER 1975

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

DECEMBER 1975

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

JANUARY 1976

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

FEBRUARY 1976

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29						

MARCH 1976

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

APRIL 1976

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

MAY 1976

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

JUNE 1976

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

JULY 1976

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September 2	Orientation for 1st-year students and registration for all medical students *Tuesday*
September 3	Classes begin *Wednesday*
November 26	Thanksgiving recess for undergraduates and 1st- and 2nd-year medical students begins after last class *Wednesday*
December 1	Classes resume *Monday*
December 19	Winter recess for undergraduates and 1st-, 2nd-, and 3rd-year medical students begins after last class *Friday*
January 5	Classes resume for 1st-, 2nd-, and 3rd-year students *Monday*
January 13	Registration for spring semester *Tuesday*
February 16	Winter Convocation (holiday) *Monday*
March 26	Spring recess for undergraduates and 1st-, 2nd-, and 3rd-year medical students begins after last class *Friday*
April 5	Classes resume *Monday*
May 14	Last day of spring semester classes *Friday*
May 17–19	Examination period *Monday–Wednesday*
May 21	Commencement *Friday*

* This Calendar is subject to change. Although registration is conducted in both September and January, there is no precise date for the end of the fall semester; some courses end before the Christmas recess while others begin before the January registration. See the *School of Medicine Schedule of Classes* for exact time of course offerings.

THE UNIVERSITY

HISTORY AND ORGANIZATION

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the Federal City. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. Within a few squares are the White House, the Department of the Interior, the State Department, the World Bank, and many other governmental offices and international agencies. The area is not without its reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

The University as it is now organized consists of Columbian College of Arts and Sciences (undergraduate); the Graduate School of Arts and Sciences; the professional schools, which include the National Law Center and the schools of Medicine and Health Sciences, Engineering and Applied Science, Education, Government and Business Administration, and Public and International Affairs; the College of General Studies; the Division of University Students; the Division of Experimental Programs; and the Summer Sessions.

The George Washington University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the president is an ex officio member.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board. The Department of Chemistry is on the approved list of the American Chemical Society.

The School of Medicine and Health Sciences has had continuous approval by the Council on Medical Education of the American Medical Association and the Association of American Medical Colleges. The Doctor of Medicine degree of the School of Medicine and Health Sciences is recognized by all state and territorial medical licensure boards in the United States.

CLOYD HECK MARVIN CENTER

The Cloyd Heck Marvin Center serves as the campus community center, providing services, conveniences, and recreational and social opportunities for students, faculty, staff, alumni, and guests. Its wide range of facilities provides the setting for a variety of programs conducted by the University Program Board; the departments of Drama, Dance, and Music; and other student and faculty organizations.

The Center Governing Board, representative of all elements of the University community, plays an important role in the day-to-day functioning of the Center. This Board works closely with the full-time staff in the development of procedures and policies which provide a framework for the Center's operation.

RECREATION

The Nation's capital provides abundant recreational resources, a large number of which are available at little or no cost. There are numerous art galleries,

museums, concert halls, theaters, swimming pools, parks, and places of great historic interest. Social activities are provided by student organizations of the University, the School of Medicine and Health Sciences, and University-sponsored programs such as intramural sports, concerts, recitals, and dramatic productions. Religious faiths are well represented in the Washington metropolitan area. Washington is one of the most colorful cultural and scientific centers of the world.

THE BOARD OF TRUSTEES 1975–76

E.K. Morris, LL.D., D.P.S., *Chairman Emeritus*

Charles E. Phillips, LL.B., LL.M., *Chairman*
*Everett H. Bellows, M.A., *Vice Chairman*
James M. Mitchell, M.A., *Secretary*
*Thaddeus A. Lindner, B.A. in Govt., *Assistant Secretary*

Robert C. Baker, LL.D.
Joel Barlow, B.A., J.D., LL.D.
George M. Bunker, B.S.
Jacob Burns, LL.B., LL.D.
George A. Butler, LL.B.
Mortimer M. Caplin, B.S., LL.B., J.S.D., LL.D.
Leon Chatelain, Jr.
Henry C. Clausen, J.D.
Jacqueline Cochran, L.H.D., LL.D., Sc.D.
Donald C. Cook, B.A., M.B.A., J.D., LL.M., L.H.D., LL.D.
Joseph B. Danzansky, B.A., J.D.
Frank G. Dickey, M.A., Ed. D., LL.D., D.Lit., L.H.D.
Nancy B. Dudley, B.A. in Govt.
John B. Duncan, B.A., LL.B., LL.D.
Lloyd H. Elliott, M.A., Ed.D., LL.D., *President of the University*, ex officio
Katharine Graham, B.A.
Melville B. Grosvenor, B.S., Sc.D., LL.D.
Joseph H. Hirshhorn
Joseph D. Hughes, B.S., J.D., LL.M., LL.D.
L.A. Jennings
David M. Kennedy, LL.B., M.A., LL.D.
Sidney A. Levine, B.A., M.D.
Franklin J. Lunding, LL.B., LL.D.
Jeremiah Milbank, B.A., M.B.A.
Donald W. Nyrop, B.A., LL.B.
Thornton W. Owen, B.S. in C.E., B.A.
Flaxie M. Pinkett, B.A.
*Abe Pollin, B.A. in Govt.
S. Dillon Ripley II, Ph.D., L.H.D., Sc.D.

*Alumni trustee.

Orville F. Rush, J.D., LL.D.
Carleton D. Smith
Charles E. Smith
Douglas R. Smith, B.S.C.
Mark Sullivan, Jr., B.A.
John W. Thompson, Jr., B.A.
William G. White, B.S. in C.E.
John J. Wilson, LL.B.
Watson W. Wise, Ph.B.
Stephen R. Woodzell, B.S. in E.E.
James O. Wright, B.S., J.D.
*Joseph S. Wright, LL.B., LL.D.

HONORARY TRUSTEES

Walter M. Bastian, LL.B., LL.D.
Harry F. Duncan
Newell W. Ellison, B.A., LL.B., LL.D.
Charles C. Glover, Jr., M.A., LL.B., LL.D.
Brooks Hays, B.A., J.D., LL.D., L.H.D., D.C.L., D.D., HH.D.
Alfred H. Lawson, LL.B., LL.D.
John K. McKee
Benjamin M. McKelway, Litt.D.
E.K. Morris, LL.D., D.P.S.
Godfrey L. Munter, B.A., LL.B., LL.D.
Alexander Wetmore, Ph.D., ScD.
Lloyd B. Wilson

OFFICERS OF ADMINISTRATION OF THE UNIVERSITY

Lloyd Hartman Elliott, M.A., Ed.D., LL.D., *President*
Harold Frederick Bright, Ph.D., *Provost and Vice President for Academic Affairs*
Seymour Alpert, B.A., M.D., *Vice President for Development*
H. John Cantini, Jr., J.D., *Vice President for Administration*
Charles Edward Diehl, B.Arch.Engr., B.C.E., M.B.A., *Vice President and Treasurer*
Ronald Paul Kaufman, B.S., M.D., *Acting Vice President for Medical Affairs*
William David Johnson, B.S., *Director of Planning and Budgeting*
Louis Harkey Mayo, B.S., J.S.D., *Vice President for Policy Studies and Special Projects*
Frederick Justin Naramore, B.S., C.P.A., *Comptroller*
William Parkhurst Smith, Jr., B.A., M.B.A., M.A. in Ed., *Vice President for Student Affairs*
Robert Gebhardtsbauer, M.A., *Registrar*
Joseph Young Ruth, B.A., *Director of Admissions*

* Alumni trustee.

THE SCHOOL OF MEDICINE AND HEALTH SCIENCES

OFFICERS OF ADMINISTRATION OF THE MEDICAL CENTER

Ronald Paul Kaufman, B.S., M.D., *Acting Vice President for Medical Affairs*

OFFICE OF ACADEMIC AFFAIRS

The Office of Academic Affairs bears the responsibility for the curriculum; student affairs, including scholarship and financial aid; research and sponsored programs; allied health programs; educational evaluation; admissions; and support services of the library and audio-visual and animal facilities.

Lawrence Thompson Bowles, M.D., Ph.D., *Acting Dean for Academic Affairs and Associate Dean for Curricular and Student Affairs*

Fred Leonard, Ph.D., *Associate Dean for Research*

Michael McCally, M.D., Ph.D., *Associate Dean for Allied Health Programs*

Robert Keimowitz, M.S., M.D., *Assistant Dean for Admissions and Director of Admissions (M.D. Program)*

Winfield Harker Scott, Ph.D., *Assistant Dean for Education and Director of Education*

OFFICE OF ADMINISTRATIVE AFFAIRS

The Office of Administrative Affairs is responsible for the administration of the University Hospital and Clinic, for support services to the School of Medicine and Health Sciences, and for the financial management of the Medical Center.

Philip Stanley Birnbaum, M.S. in M.E., B.C.E., *Dean for Administrative Affairs*

OFFICE OF CLINICAL AFFAIRS

The Office of Clinical Affairs is responsible for the patient care activities of the University Hospital and Clinic and for the supervision of the graduate and continuing medical education programs and community affiliation programs.

Ronald Paul Kaufman, B.S., M.D., *Dean for Clinical Affairs and Medical Director of the University Hospital*

Dennis Sophian O'Leary, B.A., M.D., *Associate Dean for Graduate Medical Education*

Margaret Gallagher, B.S.N., M.A., *Assistant Dean for Nursing Services and Director of Nursing*

HISTORY

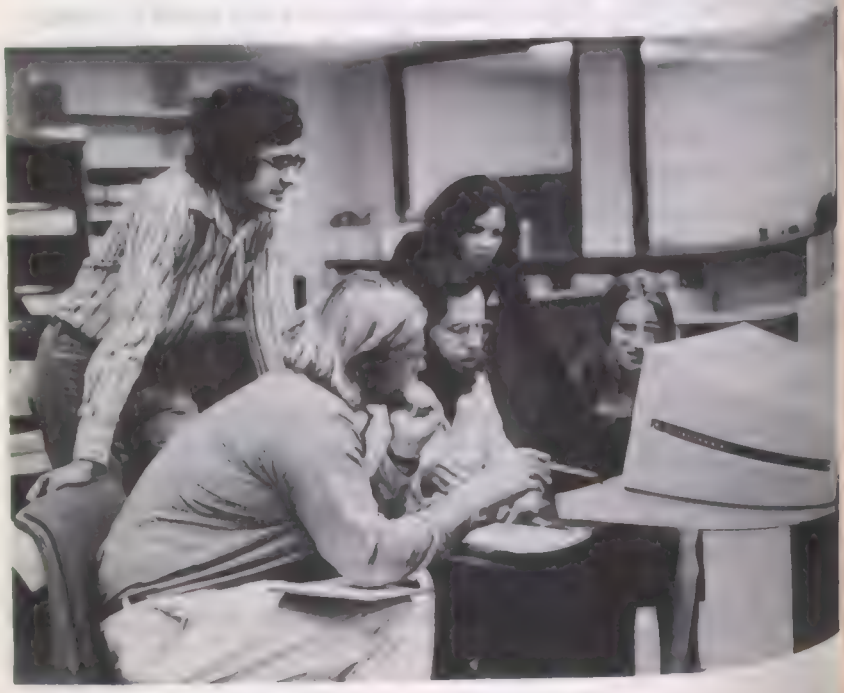
The School of Medicine and Health Sciences of George Washington University has a distinguished history that goes back more than a century. In March, 1825, the School opened with the intention of building "a medical school commensurate with the progress and demands of a rising metropolis, and the improvement of service throughout the country." The School, the eleventh oldest medical school in the country, has met this responsibility by providing its students with a foundation in the medical sciences upon which they have built medical careers in practice, teaching, research, or administration.

In 1844, the School took on a new dimension when Congress granted it the use of the Washington Infirmary. Thus one of the earliest general teaching hospitals in the Nation was established in Washington.

The distinguished history of the George Washington University School of Medicine and Health Sciences closely parallels academic advances and medical progress of the Nation. The School has contributed to both.

The George Washington University Medical Center, established in 1966, consists of Walter G. Ross Hall, which houses the School of Medicine and Health Sciences; the Paul Himmelfarb Health Sciences Library; the University Hospital; the H.B. Burns Memorial Building, which houses the University Clinic; the Helen L. and Mary E. Warwick Memorial Building; and affiliated hospitals.

In 1973, with the introduction of undergraduate programs in Allied Health Sciences, the name of the School was officially changed from the School of Medicine to the School of Medicine and Health Sciences.



REGULATIONS

A student enrolled in the University is required to conform to the following regulations and to comply with the rules and regulations of the college, school, or division in which he is registered.

A student who withdraws or is suspended, or is otherwise absent from the University for one semester or more, may re-enter and continue scholastic work only under the rules and regulations in force at the time of return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, the student's registration may be cancelled. If such falsification is discovered after the student has established an academic record at the University, the student may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the Faculty) for subsequent registration in the University.

ACADEMIC DISHONESTY

The University community, to fulfill its purposes, must establish and maintain guidelines of academic behavior. Although all members of the community are expected to exhibit honesty and competence in their academic work, incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper university channels.

Copies of the University policy on academic dishonesty can be obtained from the following offices: all department chairmen, all academic deans, and the Vice President for Academic Affairs.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions which are recipients of Federal funds. The University complies with this statute, which states, in part, that such institutions must:

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate; and
3. receive the student's written consent before releasing information from his or her education records to persons outside the University, except for directory information as indicated below. Personally identifiable information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency.

The University will release the following directory information upon request: address; telephone number; dates of attendance; school, college, or division of

enrollment; field of study; credit hours earned; degrees earned; and honors received. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar.

University guidelines on the release of student information may be obtained from the Office of the Registrar.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 261–63) contains regulations recently approved by the University's Board of Trustees.

THE LIBRARIES

Students have the privilege of using the University Library and the School of Medicine and Health Sciences Library. The stacks are open, and all students are welcome to browse at their leisure. The current Registration Card must be presented when books are borrowed for outside use.

All students using the libraries are expected to be familiar with the regulations governing their use, which are available at each library.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property. A "Lost and Found" Office is maintained on campus in the Safety and Security Office.

STUDENT AFFAIRS

The Office of the Vice President for Student Affairs develops student life programs, policies, and procedures to complement the University's formal instruction program. These activities are implemented through the offices of the Cloyd Heck Marvin Center, Counseling Center, Dean of Students, Educational Opportunity Program, Housing, International Students, Student Activities, Student and Alumni Career Services, and Student Health Service. More detailed information on these and other activities is contained in the *Student Handbook*.

STUDENT HEALTH SERVICE

The Student Health Service is a general outpatient clinic designed to assist students registered on campus with their health needs. This Service is located at 935 22nd Street, N.W. (in the H.B. Burns Memorial Building).

Physicians are available by appointment from 9 a.m. to 4:45 p.m., Monday through Friday. In addition, physicians are available to walk-in patients from 6 p.m. to 10 p.m., Monday through Friday, and from 9 a.m. to 12 noon on Saturday. This schedule is also maintained during the Summer Sessions, except that the evening closing hour Monday through Friday is 9 p.m.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. This arrangement is for emergency care only, and all fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. A student who is not currently enrolled or who has severed his connection with the University is ineligible for medical benefits of the Student Health Service. Any student may engage, if he so desires, physicians and nurses of his own choice, but he will be responsible for all fees charged. The bills incurred from all services rendered outside of the Student Health Service (for example, X-ray work and referrals to specialists or other outside physicians) are the responsibility of the student. Within the Student Health Service, there will be only a few small charges for some services, such as materials for an allergy injection series, overseas immunizations, and certain other services.

Any student who intends to train for an athletic team is required to pass a thorough medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Human Kinetics and Leisure Studies.

HEALTH AND ACCIDENT INSURANCE

The Student Health Service has arranged for and endorsed group health and accident insurance, on an elective basis, for those full-time students who do not have other coverage. Students are encouraged to carry adequate health insurance coverage for themselves and, if married, for their spouses and children. Interested students should contact the Student Health Service Office.

PHYSICAL EXAMINATIONS

All first-year students are required to have a comprehensive physical examination prior to admission to the School of Medicine and Health Sciences. The students are informed of significant findings and advised regarding such measures as will tend to help them maintain a high standard of health.

In addition medical students benefit from the complete Tuberculosis Case Finding Program which the School maintains. Under this program all students receive tuberculin tests, X-ray examinations, and such special attention from chest specialists as is necessary to reduce to a minimum the dangers from tuberculosis. Students are immunized against those diseases for which proven prophylaxis exists.

RESIDENCE HALLS

Complete information concerning the University's residence halls is available from the Director of Housing, George Washington University, Washington, D.C. 20052. Information concerning off-campus housing may be obtained at this Office and at the Office of the Dean for Academic Affairs. Reservations for private housing must be made by students.

MUNSON HALL APARTMENTS

Munson Hall is a University-owned and operated apartment house containing 15 one-bedroom and 54 efficiency apartments. Graduate and married students are given priority for residency until July 15 each year. Seniors and juniors who have lived at least one year in University residence halls will be considered for residency after that date if space is available. All leases are for 12 months

HOUSING FOR UNDERGRADUATE STUDENTS

Admission to the University does not include a room reservation. The student will receive, with his notification of acceptance, University residence hall information, an application for residence hall space, and a declaration of intent to attend the University. The application for residence hall space must be accompanied by a $100 *nonrefundable deposit*. The housing deposit is credited toward the first semester's room charge. Rooms are leased for the academic year, and lease payment must be made by June 27 for the fall semester.

1975–76 RESIDENCE HALL RATES PER PERSON FOR TWO SEMESTERS*

For Men:	
Calhoun Hall	$97
double room	92
triple room	
For Women:	
Strong Hall	1,02
single room	97
double room	
For Men and Women:	
Crawford Hall (limited to sophomores, juniors, and seniors)—double room	1,02
Mitchell Hall (limited to sophomores, juniors, and seniors)—single room	97
Thurston Hall	92
double room, triple room, large room for four	
suite for six	

FOOD SERVICE

Resident freshmen and sophomores are required to participate in the food service plan. Freshmen must participate in the seven-day, 20 meals per week plan at the rate of $764† for the academic year. Sophomores may elect either the 20-meal plan or a five-day meal plan, 15 meals Monday through Friday, for

---

* Residence hall rates subject to change.
† Food service prices subject to change.

$725* for the academic year. Each plan is optional for junior, senior, and graduate students. Food service payment does not cover University intersession or vacation periods. All meal cards admit bearer to the dining room in Thurston Hall and the second floor contract dining room in the Cloyd Heck Marvin Center.

VETERANS EDUCATION

The Office of the Registrar, Luther Rice Hall, 2121 Eye Street, N.W., assists students entitled to educational benefits as veterans or war orphans with any problems which may arise concerning their benefits. This Office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should consult the Office of the Registrar prior to submitting application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 20421.

Facilities

Walter G. Ross Hall.—Walter G. Ross Hall was dedicated and opened in May, 1973. This modern facility provides the teaching and laboratory facilities for students in the School of Medicine and Health Sciences. It occupies a city block of Washington on the northwest edge of the University campus, and its gross area is approximately 550,000 square feet, more than 10 acres. The building is equipped with modern audio-visual and other teaching equipment as well as basic science laboratories.

Paul Himmelfarb Health Sciences Library.—The Paul Himmelfarb Health Sciences Library, adjacent to Walter G. Ross Hall, is a modern facility that seats 400 individuals at a time. The Library has a capacity of 80,000 volumes and subscribes to 1,500 scientific periodicals. Its collection includes 18th- and 19th-century medical and surgical texts and many rare books. The Library is equipped with self-study educational units composed of 12 audio-visual carrels, each of which is filled with its own film and sound projection equipment.

The George Washington University Hospital.—This 550-bed hospital, including the Eugene Meyer Pavilion, is adjacent to the School of Medicine and Health Sciences. It is the primary clinical teaching facility for the students and for a large house staff. It is fully approved and accredited by the American Medical Association, the American Hospital Association, the American College of Physicians, and the American College of Surgeons, through the Joint Com-

*Food service prices subject to change.



Left, George Washington University Clinic, housed in the H.B. Burns Memorial Building. Below, George Washington University Hospital as seen from Washington Circle. In left corner of photo is the Watson Wing Emergency Pavilion. Bottom, page 17, Walter C. Ross Hall and, in foreground, the adjoining Paul Himmelfarb Health Sciences Library.



mission for the Accreditation of Hospitals. Annual patient admissions number approximately 20,000.

The Watson Wise Emergency Pavilion of the Hospital logs in approximately 40,000 patient visits annually and is one of the city's most active emergency units.

The University Hospital is equipped to serve 16 specialty fields. Complex teamwork procedures such as renal dialysis, a computerized X-ray unit for diagnosing brain diseases, cardiac catheterization, open-heart surgery, transplant surgery, and total hip replacements are included in its activities. Facilities include a surgical suite of 10 rooms, two of which are equipped with overhead galleries where observers may communicate with the surgical teams, observe the electronic patient-monitoring system in action, and view the intricate surgical procedures below.

The Helen L. and Mary E. Warwick Memorial Building.—This building houses a computerized multitest facility that is available to physicians for patient evaluation.

The University Clinic.—The Clinic is housed in the 13-story H.B. Burns Memorial Building, where ambulatory care is consolidated and integrated with the teaching program. The academic group practice of physicians in general medicine and more than 20 specialists is based in the Burns Building. Visits of ambulatory patients number approximately 90,000 annually.

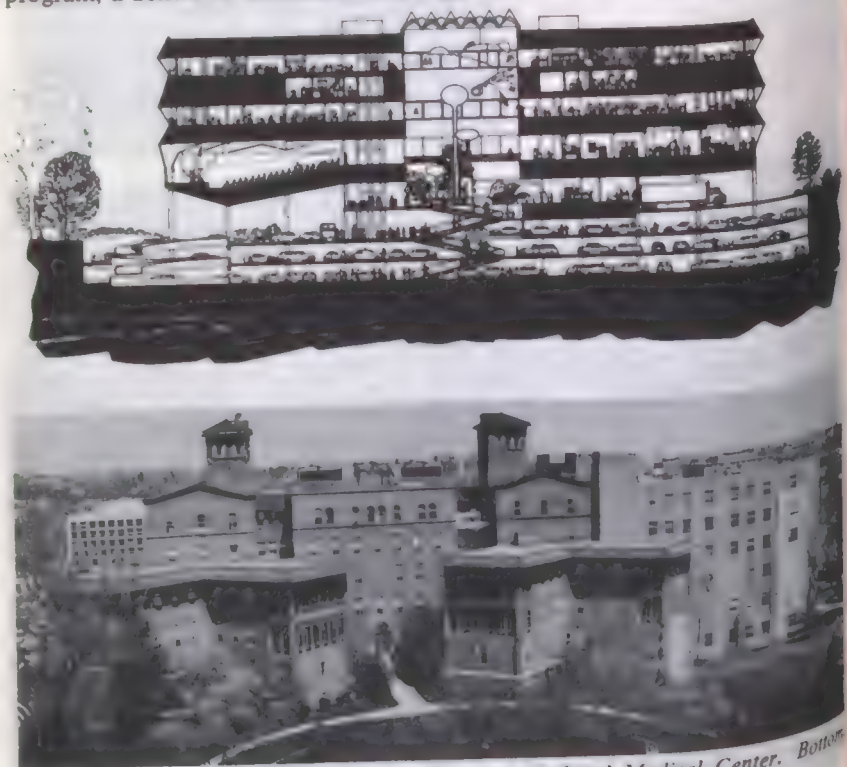


AFFILIATED HOSPITALS

Children's Hospital National Medical Center.—Children's, one of the finest pediatric health care centers in the country, houses 220 inpatient beds, including a specialized referral intensive care nursery and an adolescent unit. Its ambulatory Diagnostic and Treatment Center handles in excess of 120,000 visits a year. Children's is the major base for the School of Medicine and Health Science's Department of Child Health and Development, and for the assigned pediatric clerkship. A variety of elective opportunities are offered in various aspects of child health.

Columbia Hospital for Women.—This hospital, situated two blocks from the University Hospital, is utilized by medical students for training in obstetrics and gynecology. Columbia Hospital for Women is an affiliated hospital for residency training in Obstetrics and Gynecology in the George Washington University Medical Center Program.

Fairfax Hospital.—This 530-bed voluntary community teaching hospital serves a burgeoning surburban area and provides all clinical services including psychiatry. Each year more than 20,600 patients are admitted, 4,900 babies delivered, 15,000 surgical operations performed, and 49,200 persons examined and treated in the Emergency Suite. Fairfax Hospital offers a rotating internship program, a School of Medical Technology, and clinical facilities for a School of



Top, cutaway view of new Children's Hospital National Medical Center. Bottom, Columbia Hospital for Women.



Holy Cross Hospital of Silver Spring.

ractical Nursing. Students of the School of Medicine and Health Sciences erve at this hospital in clinical clerkship and elective programs. Fairfax Hos- tal is an affiliated hospital for residency training in Obstetrics and Gynecology the George Washington University Medical Center Program.

Holy Cross Hospital.—Holy Cross, a modern 338-bed hospital, is a primary nical campus which provides students with first-hand exposure to the practice medicine in the community. It is a private, voluntary facility in which the ll range of medical, surgical, and pediatric services are provided for a grow- g suburban population. Last year, more than 19,000 patients were hospital- ed, nearly 47,000 emergency visits were registered, and 3,263 babies were de- ered at Holy Cross. The hospital, which has consistently experienced one of e highest occupancy rates in the Washington metropolitan area, is planning an ansion to include an additional 112 beds, enlarged emergency room facili- s, and a new, self-contained center for in-and-out surgery.

National Naval Medical Center.—The Naval Hospital at the National Naval edical Center, Bethesda, Md., is a 750-bed general hospital offering a de range of specialized services, clinical research, and educational programs. edical care is provided to active duty and retired military members and their pendents. It is a major referral center for thoracic and cardiovascular sur- ry as well as for cancer therapy. The teaching staff directs a complete intern- ip and residency program in 21 specialties.

St. Elizabeths Hospital.—St. Elizabeths Hospital, established by an act of ongress in 1855, is a federal psychiatric hospital administered under the De- rtment of Health, Education, and Welfare. This hospital provides for the atment, care, and general well-being of approximately 6,000 patients of hom 3,400 are resident. The facility includes a completely approved General spital to meet the needs for medical and surgical care and functions with a ll-time staff within the hospital plus attending physicians in various specialties. e hospital maintains an up-to-date medical library.

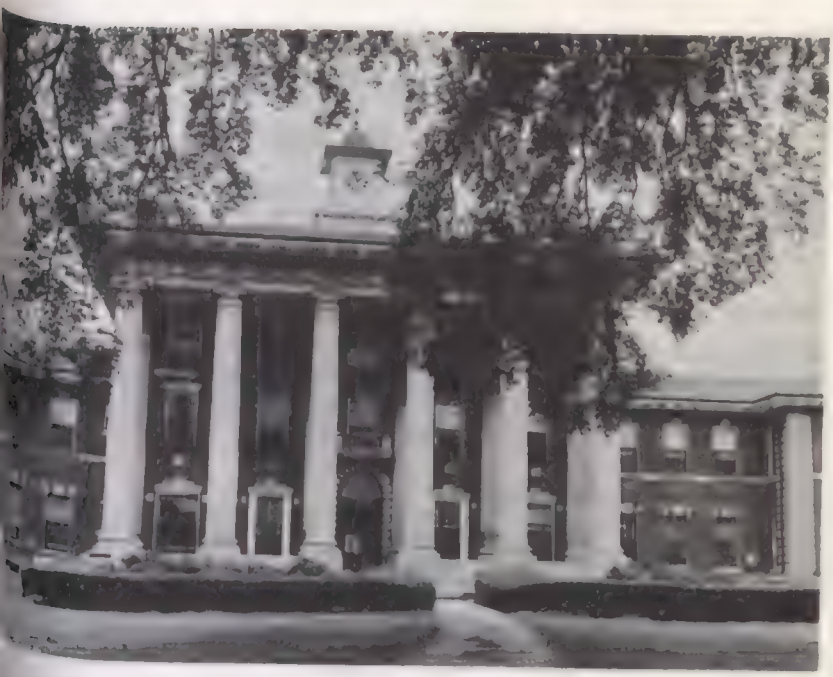


Top, Veterans Administration Hospital, Washington, D.C. Bottom, Washington Hospital Center.

Medical students of George Washington University utilize the facilities of St. Elizabeths for clinical psychiatric training. Opportunities for research are enhanced by a cooperative arrangement with the National Institute of Mental Health of the United States Public Health Service.

Veterans Administration Hospital.—In addition to the medical, surgical, psychiatric, neurological, tubercular, and physical medicine and rehabilitation services, this 700-bed hospital has a large outpatient program; an extensive medical research program; programs in open heart surgery, cobalt therapy, and renal dialysis; a metabolic program; and a specially designed Administrative Research Laboratory.

Washington Hospital Center.—This 843-bed private, voluntary institution serves the greater Washington area through a triad of activities: patient care, teaching, and research. The Center is the tenth busiest of more than 7,000 hospitals in the United States and the second busiest private hospital in terms of inpatient admissions. A very active emergency service cares for more than 49,000 patients a year, and the 50 clinics provide all major clinical services except pediatrics for about 65,400 outpatients and 31,700 inpatients yearly. In addition to an extensive approved internship and residency program, the Center offers organized instruction for nurses, laboratory and X-ray technicians, medical secretaries, and other health-related vocations.





... the administration building of St. Elizabeths Hospital. Bottom, Naval Hospital ... the National Naval Medical Center.

Committees

ADMISSIONS COMMITTEE

Robert Keimowitz *(Chairman)*, M.P. Footer, Frederick Green, Milton Gusack, John LaRosa, R.J. Neviaser, Raymond Noble, G.A. Walker, Benny Waxman, Margery Johnson *(3rd-year student)*, Carolyn Kubik *(2nd-year student)*, L.T. Bowles *(ex officio)*, D.H. Glew, Jr. *(ex officio)*, W.H. Scott *(ex officio)*, Joan Sealy *(Consultant)*

ADVISORY COMMITTEE ON ACADEMIC AFFAIRS

J.P. Naughton *(Chairman)*, P.C. Adkins, V.H. Cohn, Toni Daniels, M.L. Elgart, Stephen Haas, S.D. Loube, A.M. Margileth, S.C. Marinoff, Robert Ostroff *(3rd-year student)*, David Reiss, S.D. Rockoff, D.R. Rosing, L.T. Bowles *(ex officio)*, Fred Leonard *(ex officio)*, R.P. Kaufman *(ex officio)*

ALLIED HEALTH COMMITTEE

Michael McCally *(Chairman)*, P.S. Birnbaum, Robert Branc *(Physician's Assistant Student)*, Justin Frank, Leon Gintzig, Suzanne Hammersberg, Donald Hawkins, James Hillis, Jack Kleh, C.H. Klingenmaier, Paul Mazel, J.W. Millar, Vincent Murray, S.D. Rockoff, R.D. Shapiro, R.S. Snell, Jarrett Wise, Earl Ross *(ex officio)*, George Stoner *(ex officio)*

ANIMAL RESEARCH FACILITIES COMMITTEE

W.L. Joseph *(Chairman)*, A.B. Butler, W.P. Fortune, H.F. Gorfinkel, Kun-yen Huang, L.W. Thompson, Fred Leonard *(ex officio)*, B.C. Zook *(ex officio)*

APPOINTMENTS AND PROMOTIONS COMMITTEE

R.H. Parrott *(Chairman)*, W.O. Dobbins, R.A. Kenney, Jason Mann *(4th-year student)*, Lawrence Rabkin *(3rd-year student)*, H.V. Rizzoli, G.V. Vahouny, W.S. McCune

CONTINUING MEDICAL EDUCATION COMMITTEE

S.A. Schroeder *(Chairman)*, C.T. Bever, J.F. Calvert *(3rd-year student)*, J.W. Canter, W.H. Cooper, Daniel Ein, Morris Feitel, William Fouty, Eugene Hargrove, V.M. Iovine, A.M. Margileth, J.J. Rheingold, Robert Saunders, J.R. Shapiro, William Sutherland, S.J. Talpers, Mario Werner, Karl Wipplinger, L.T. Bowles *(ex officio)*, Dennis O'Leary *(ex officio)*

EDUCATIONAL EVALUATION COMMITTEE

W.H. Scott *(Chairman)*, Gordon Avery, Frank Boruch, M.M. Cassidy, Kenneth Chase, W.H. Cooper, J.B. Erdmann, V.M. Iovine, R.M. Kaufman, Philip Klubes, Helen Lederer *(2nd-year student)*, Joseph Lindsay, Dennis O'Leary, T.E. Piemme, Stephen Romansky *(3rd-year student)*, B.W. Smith, Donna Wemple *(1st-year student)*, L.T. Bowles *(ex officio)*, Robert Keimowitz *(ex officio)*

EDUCATIONAL PLANNING COMMITTEE

T.G. Webster *(Chairman)*, L.F. Affronti, Gordon Avery, Alexander Breslow, W. Donnelly, March Enders, Paul Epstein *(1st-year student)*, Milton Gusack, ff Jacobson *(2nd-year student)*, Hilliard Jason, Cathryn Kaiser *(4th-year stu-ent)*, P.I. Kenmore, R.A. Kenney, L.S. Lessin, H.G. Mandel, T.E. Piemme, S. Snell, Neofytos Tsangaris, G.V. Vahouny, Albert Weaver *(3rd-year stu-ent)*, A.B. Weingold, A.C. Wyman, W.S. Yamamoto, L.T. Bowles *(ex officio)*, H. Scott *(ex officio)*

XECUTIVE COMMITTEE OF THE MEDICAL CENTER

.F. Armaly, D.W. Davis, D.W. Delaney *(House Officer)*, B.S. Epstein, W.N. nsen, R.A. Kenney, S.D. Loube, H.G. Mandel, Stephen Romansky *(3rd-year udent)*, R.S. Snell, Allen Weingold, J.J. Feffer *(ex officio)*, D.H. Glew, Jr. *(ex ficio)*, R.P. Kaufman *(ex officio)*, J.P. Naughton *(ex officio)*, P.S. Birnbaum *(ex ficio)*

RADUATE EDUCATION PLANNING COMMITTEE

S. O'Leary *(Chairman)*, M.F. Armaly, D.W. Delaney, Daniel Ein, M.L. El-rt, Gary Goldstein *(3rd-year student)*, Jeff Jacobson *(2nd-year student)*, W.N. nsen, F.N. Miller, H.C. Miller, R.J. Neviaser, Sean O'Reilly, T.E. Piemme, D. Rockoff, P.E. Shorb, D.R. Smith, E.B. Truitt, A.B. Weingold, Herbert ntraub, Terry White, L.T. Bowles *(ex officio)*, Michael McCally *(ex officio)*, H. Scott *(ex officio)*

DIATION AND RADIOISOTOPE COMMITTEE

eodore Villafaña *(Chairman)*, E.W. Bradley, Martyn Bailey, D.H. Glew, Jr., Harder, Stephen Heller, L.R. Kirkland, B.E. Lessin, J.G. Maier, S.D. koff, V.M. Varma, Mario Werner, B.C. Zook

SEARCH COMMITTEE

Treadwell *(Chairman)*, G.S. Edwards, John Gossom *(3rd-year student)*, Jackson, W.L. Joseph, Floyd Katske *(3rd-year student)*, S.G. Kent, Gloria saro, Bruce McClennan, A.E. Parrish, P.O. Periman, H.V. Pipberger, Mel-Reich, David Reiss, M.J. Stern, Harold Stevens, Fred Leonard *(ex officio)*

DENT ADVISORY COMMITTEE

Naughton *(Chairman)*, Peter Basch *(1st-year student)*, L.T. Bowles, Gordon k *(2nd-year student)*, Robert Hales *(2nd-year student)*, Cathryn Kaiser *(4th-student)*, R.P. Kaufman, Frederick Lough *(4th-year student)*, Michael Mc-; J.F. Mermel, Delia O'Hara *(Allied Health Student)*, Kimball Orton *(1st-student)*, Stephen Romansky *(3rd-year student)*, William van Wambeke *ed Health Student)*, Anne Woods *(3rd-year student)*

ALUMNI AND ALLIED ASSOCIATIONS

THE GENERAL ALUMNI ASSOCIATION

THE OBJECTIVES OF THIS ASSOCIATION are to unite graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the University and left the University in good standing, or any person who is or has been a member of the teaching, research, or administrative staff of the University, or of the Board of Trustees of the University. Active members are those eligible members who are current contributors (dues or otherwise) to or life members of the George Washington University General Alumni Association, the Alumni Association of any school of the University, or contributors to the Annual Support Program.

The Alumni Office is in Alumni House, 714 Twenty-first Street, N.W., Washington, D.C. 20052. All alumni are urged to keep the Alumni Office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

THE GEORGE WASHINGTON UNIVERSITY MEDICAL ALUMNI ASSOCIATION

THE GEORGE WASHINGTON UNIVERSITY Medical Alumni Association, incorporated in 1959, continues the organization previously known as the George Washington University Medical Society.

The stated purposes of the Association are as follows: "This shall be a non-profit organization international in scope, whose objectives shall be to provide constructive services for the M.D. degree alumni of the George Washington University School of Medicine and Health Sciences for furthering the art and science of medicine, research, and for the promotion of the welfare of the George Washington University School of Medicine and Health Sciences, its students, the George Washington University Hospital and its trainees."

Active membership in the Association consists of all M.D. degree graduates of the School of Medicine and Health Sciences; current members and, on application, past members of the teaching staff of the School of Medicine and Health Sciences, who hold doctoral degrees; Doctors of Medicine who have had one or more years of postgraduate training in the George Washington University

Hospital. Junior membership consists of all members of the student body of the M.D. degree program of the School of Medicine and Health Sciences.

The Medical Alumni Association maintains an office in the School of Medicine and Health Sciences.

OFFICERS FOR 1974–75

President—Donald H. Glew, Jr., M.D. 1948
President Elect—John F. Mermel, M.D. 1960
First Vice President—Dee R. Parkinson, M.D. 1943
Second Vice President—Kent A. Peterson, B.A. 1956, M.D. 1959
Secretary—Carlos A. Silva, M.D. 1960
Treasurer—Harry C. Beaver, M.D. 1963
Council:
James P. Burns, Jr., M.D. 1949
Jerome W. Canter, M.D. 1955
Marvin P. Footer, B.A. 1938, M.D. 1942
Thomas H. Goodridge, M.D. 1965
Stanley M. Kirson, B.A., M.D. 1957
Sidney A. Levine, M.D. 1941
Samuel D. Loube, B.A. 1941, M.D. 1943
John Lyles, 1970
Charles W. Thompson, M.D. 1941
William F. Thompson, M.D. 1967

The Doctor of Medicine Degree Program

ADMISSION

THE GEORGE WASHINGTON UNIVERSITY School of Medicine and Health Sciences seeks to enroll intellectually gifted, humanly sensitive, mature persons who will excel in the science and art of medicine. Applicants of diverse social and educational backgrounds have access to the admissions process. In the selection process there is no discrimination because of sex, race, color, religion, or national or regional origin.

ENTRANCE REQUIREMENTS

ADMISSION TO THE FIRST-YEAR CLASS

For admission to the Doctor of Medicine degree program, a minimum of 90 semester hours must have been earned in an accredited institution of higher learning. Credits earned in a professional school can be applied to the fulfillment of this minimum requirement only if they are acceptable by the applicant's college or university toward a Bachelor's degree in Arts or Science. (A credit under the quarter system is two-thirds of a semester hour.) It is advantageous to complete four full years of undergraduate study. Only exceptional students are accepted upon completion of the minimal requirements.

It is possible for exceptional students with three years of undergraduate work in Columbian College of George Washington University to be admitted to this medical school and to receive a combined Bachelor of Arts-Doctor of Medicine degree. More detailed information on this program is given on page 31.

The following courses must be completed with satisfactory achievement before the applicant can be certified for matriculation. All required science courses must include sufficient laboratory work to give assurance of familiarity with the experimental methods and techniques of the disciplines.

1. **Biology:** 8 semester hours, including 2 semester hours of laboratory. This may be either in general biology or zoology but may *not* include separately credited courses in botany.
2. **Chemistry:** 8 semester hours of general inorganic chemistry (which may include qualitative analysis), including 2 semester hours of laboratory; 6 to 8 semester hours of organic chemistry, including laboratory.
3. **Physics:** 8 semester hours, including at least 2 semester hours of laboratory.
4. **English:** 6 semester hours in composition and literature. This may be the usual introductory college course or its equivalent.

The number of required courses has been kept to a minimum in order to allow college students the time to pursue their own interests in depth. The Admissions Committee has no preference with regard to the major area of study of the applicant. Students with backgrounds in the arts, humanities, and social sciences are as admissible as applicants with science backgrounds. The Committee does expect that work in the student's chosen area of concentration as well as in the required science courses should reflect his scholarly interests and show evidence of significant achievement.

DMISSION WITH ADVANCED STANDING

he applicant for admission with advanced standing should understand that ery few spaces are available for transfer students because of recent substantial ncreases in the size of the first- and second-year classes. Transfers into the econd year are considered only in exceptional circumstances. Positions in the hird-year class, when available, will be offered to students transferring from merican medical schools or to American citizens attending foreign medical chools.

The applicant for advanced standing must fulfill the following requirements:

1. The applicant must be or have been a regularly registered student in a chool of medicine which is a member or an affiliate member of the Association f American Medical Colleges. Citizens of the United States in foreign medical chools, other than those in Canada, should participate in the COTRANS pro- ram sponsored by the Association of American Medical Colleges. Information this program may be obtained from the Association at One Dupont Circle, W., Washington, D.C. 20036.

2. The applicant must be in good standing and eligible to continue in the chool where he or she is currently enrolled, or must be eligible to re-enter that chool if his education has been interrupted.

3. The applicant must have completed a course of study at least equivalent to at required for advancement to the year for which he is applying had he been tudent in the George Washington School of Medicine and Health Sciences. r admission to the second year, he must have completed all work in anatomy, chemistry, microbiology, and physiology. For admission to the third year, must have finished all work in these subjects, as well as all work in pathology d pharmacology; must have completed didactic courses in medicine, surgery, etrics and gynecology, pediatrics, and psychiatry; and also must have had actical experience in the clinical evaluation of the patient, including physical gnosis and laboratory medicine.

4. The applicant must have the endorsement of the dean of his school of dicine or his authorized delegate.

5. The applicant must take the Part I Examination of the National Board of dical Examiners if he is applying for admission to the third year. He should to take the examination in June of the year in which he wishes to enter. izens of the United States attending foreign medical schools, other than those Canada, are required to pass all subjects of the Part I Examination in order demonstrate competence in the basic sciences. For admission to the second r, citizens of the United States attending foreign medical schools, other than se in Canada, must pass the National Board Examinations in anatomy, bio- emistry, microbiology, and physiology.

PLICATION PROCEDURE

MISSION TO THE FIRST-YEAR CLASS

e School is a participant in the American Medical College Application Serv- (AMCAS). Applications for a place in the first-year class can be obtained from AMCAS, 1776 Massachusetts Avenue, N.W., Suite 301, Washington, 20036. When completed, this application is returned to AMCAS for dis- ution to schools selected by the applicant. The AMCAS application dead- is November 15, 1975.

After receipt of our copy of the AMCAS application, the Office of Admissions will send applicants a Supplemental Application. This requests information not included on the AMCAS application. Submission of this supplemental application (due no later than December 31, 1975), including the nonrefundable supplemental application fee ($25), will initiate Admissions Committee processing of the application. On the basis of the available information some applicants will be asked to have letters of evaluation (recommendation) sent. After careful review of these documents the Committee will extend an invitation for interview to the most promising candidates. When these steps are completed, the application will be brought to the Admissions Committee for final decision. Applicants will be informed of final decisions immediately. Although it does not assume an obligation to report missing or erroneous credentials, the Admissions Office will try to contact the applicant if it is noted that necessary credentials are missing.

This institution also participates in the AMCAS Early Decision Program. Interested applicants for the 1976–77 entering class are referred to the AMCAS "Information Booklet" included with the AMCAS application materials. Early decision applicants should be aware that they must submit their application by August, 1975, and that for consideration, the supplemental application and all letters of recommendation and transcripts must be received by the Office of Admissions no later than September 1, 1975. Decisions on early decision candidates are made usually by October 1 and no later than October 15, 1975.

Applicants are referred to the AMCAS "Information Booklet for the 1976–77 Entering Class" for the most up-to-date information available at the time of application. Details included in that booklet supersede information contained herein.

ADMISSION WITH ADVANCED STANDING

Applications for admission with advanced standing should be obtained from the Office of Admissions (M.D. Program), School of Medicine and Health Sciences, 2300 Eye Street, N.W., Washington, D.C. 20037.

The application, the nonrefundable application fee of $25, and all supporting credentials must be received by the Office of Admissions no later than April 15. Supporting credentials include transcripts from each institution attended since high school (including certified originals with translations of foreign medical school records) letters of recommendation, including the Dean's letter, and Medical College Admission Test scores. Applicants applying through COTRANS should meet the April 15 deadline, although the Office of Admissions will wait until the National Board scores are available in June or July before making final decisions.

The most recent application information will be made available at the time an applicant requests his application. That information will supersede information contained herein.

SELECTION PROCEDURES

To process the vast number of applications to this institution fairly and expeditiously, a screening evaluation system is utilized. This evaluation procedure screens applicants on the basis of undergraduate grades (taking into ac-

count improvement in performance in later years), Medical College Admission Test scores, and pertinent extracurricular and work experiences. Some additional consideration is given to applicants from the District of Columbia and the neighboring metropolitan area, as well as to applicants from George Washington University. Although there are no age limits, the very young and relatively older applicants must demonstrate considerable strength in other aspects of their applications.

When all credentials and interview reports are available, the application is reviewed by the entire Admissions Committee. In this review, although grades and



MCAT scores are considered, major consideration is given to the essay portions of the applications, the letters of recommendation, and the interview reports, in an attempt to assess those motivational and personal characteristics that the Committee feels are so important in choosing future physicians.

An applicant who is offered a place in the class is required, within two weeks, to notify the Office of Admissions (M.D. Program) of the School of Medicine and Health Sciences in writing of his intent to accept the place reserved for him. A deposit of $100 is also required by a specific date after notification of acceptance. The date will be given in the notice of acceptance. The deposit will not be refunded after registration but will be credited toward the tuition of the first semester.

PROGRAM OF STUDY

The faculty and administration of the School of Medicine and Health Sciences have developed a curriculum designed to prepare each student for a professional life of continuous learning. Because students differ in background, ability, and career interests, the curriculum is balanced with required courses, and each student is encouraged to maximize achievement within his or her own limits. It is presumed that all graduates will seek additional education in graduate training programs before assuming complete responsibility for independent clinical decision-making.

In the first year, the student concentrates primarily on basic sciences, beginning with an orientation in cell biology taught by members of all basic science departments. The remainder of the first semester includes anatomy, biochemistry, and finishes with an introduction to neurobiology which bridges the one-month vacation in December-January to the second semester. In the second semester, the student concentrates on physiology and microbiology in addition to the integrated course in neurobiology.

The second year integrates basic science and clinical information. Pathology and pharmacology provide the major basic science substrates. This academic program has been evolving since 1970 and several innovations have been introduced each year. The course is coordinated by a program director. Integration is accomplished through the work of faculty subcommittees working with the program director and the second year subcommittee on educational planning. Medical students are introduced to physical diagnosis during the first semester of the second year.

A two-year continuum of required clerkships and elective sequences is designed to bring the student to optimal readiness for graduate training which begins in the third year. Clerkships are required in medicine, surgery, pediatrics, obstetrics-gynecology, psychiatry, and health care sciences. A great variety of elective experience is available at George Washington and its affiliated hospitals, and permission may be obtained to take electives away from the George Washington campus.

During the entire educational experience, students are encouraged to assume responsibility for their self-assessment and continued learning. It is the goal of the faculty to select and educate concerned human beings who will function productively and effectively for a long career in medicine.

DEGREE REQUIREMENTS

Every candidate for graduation with the degree of Doctor of Medicine must have satisfactorily completed the requirements of the School of Medicine and Health Sciences as described on page 30, including no less than four academic years of study as a matriculated student in medicine. All required courses must be completed and all prescribed examinations satisfactorily passed.

HONORS

Candidates who have completed the four-year course for the Doctor of Medicine degree and have received the grade of *H* (Honors) in courses totalling 50 per cent or more of the total number of semester hours taken may be recommended by the Executive Committee of the Medical Center for graduation "With Distinction."

COMBINED DEGREE PROGRAMS

COMBINED BACHELOR OF ARTS AND DOCTOR OF MEDICINE

To be recommended for the degree of Bachelor of Arts, the candidate must complete at least 94 semester hours of prescribed college work (at least 30 hours and one year of residence must be completed in Columbian College of Arts and Sciences) and the first year of the medical curriculum. Upon satisfactory completion of the fourth year of the medical curriculum the student becomes eligible for the degree of Doctor of Medicine.

It should be understood, however, that admission to Columbian College does not guarantee admission to the School of Medicine and Health Care Sciences.

COMBINED MASTER OF SCIENCE AND DOCTOR OF MEDICINE

The departments of the School of Medicine and Health Sciences cooperate with the Graduate School of Arts and Sciences in offering programs leading to the combined degrees of Master of Science and Doctor of Medicine in the fields of anatomic pathology, biochemistry, genetics, microbiology, mycology, pharmacology, and physiology.

Students in the School of Medicine and Health Sciences who wish to apply for the combined degrees of Master of Science and Doctor of Medicine must meet the requirements for admission to the Graduate School of Arts and Sciences. They must be recommended by the chairman of the department and by the Dean of the Graduate School of Arts and Sciences and the Dean for Academic Affairs of the Medical Center.

The Master of Science degree program consists of a minimum of 30 semester hours which includes a thesis (equivalent to 6 semester hours). For a Master of Science degree program which does *not* include a thesis, the number of semester hours of graduate course work is determined by the department. The program

without the thesis is not an individual student option and is not available in every department.

A maximum of 12 semester hours of credit for graduate-level courses *completed as a part of the Doctor of Medicine degree* (and not already applied toward the bachelor's degree) will be allowed in fulfillment of the requirements of the Master of Science degree. The remaining semester hours of work, including a thesis if it is required, must be in course work in the basic medical sciences normally required for a Master of Science degree in the Graduate School of Arts and Sciences.

DUAL PROGRAM FOR THE DOCTOR OF MEDICINE AND DOCTOR OF PHILOSOPHY DEGREES

In cooperation with the Graduate School of Arts and Sciences a dual program is available to qualified students who seek both the Doctor of Medicine and Doctor of Philosophy degrees. The requirements which must be fulfilled for both degrees are identical to those currently and separately established in the School of Medicine and Health Sciences and the Graduate School of Arts and Sciences.

In order to enter the dual degree program, a prospective student first must apply for and gain admission to both the Graduate School of Arts and Sciences and the School of Medicine and Health Sciences separately through established procedures. Upon admission to both schools, he may then apply for affiliation with the dual degree program. Work toward the Doctor of Philosophy degree is performed under the jurisdiction of a *departmental* Doctoral Committee and is available in more than fifty research fields.

A student working toward these degrees may apply a maximum of 24 semester hours of approved work taken in the M.D. degree program of the School of Medicine and Health Sciences toward the total of 72 semester hours required to complete the requirements for the Doctor of Philosophy degree. Twenty-four hours of this requirement must be earned in graduate courses during periods when the student is not obligated to full-time enrollment in the M.D. degree program, i.e., during summer sessions, vacation periods, etc. The final 24 semester hours of dissertation research toward the Doctor of Philosophy degree may begin concurrently with the final semester of graduate course work. The estimated time for completion of this dual program is six years.

MASTER OF SCIENCE AND DOCTOR OF PHILOSOPHY REQUIREMENTS

The detailed requirements for the degrees of Master of Science and Doctor of Philosophy are stated in the *Undergraduate and Graduate Catalogue* of the University, which is available at the Graduate School of Arts and Sciences, George Washington University, Washington, D.C. 20052.

REGISTRATION

Registration for the 1975–76 fall semester will be conducted from 10 a.m. to 2 p.m., on September 2. The place of registration for the fall semester as well as the time and place of registration for the spring semester and the summer session of fourth-year clerkships will be announced in the *Schedule of Classes*.

FEES AND FINANCIAL REGULATIONS FOR M.D. CANDIDATES

The following fees have been established for the academic year 1975–76. (See page 34 for projected tuition fee increases for 1976–80.)

Application fee	$25.00
Tuition fee, for the academic year	5,000.00
University Center fee, charged all students (except those granted "leave of absence" status) each semester	46.50
Late registration fee, for failure to register within the designated period	15.00
Late payment fee, charged for failure to make payments when due (see "Payment of Fees," below)	15.00
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," below)	35.00
Continuous Registration fee, charged each student granted "leave of absence" status for each semester in the School of Medicine and Health Sciences	94.00
University Center fee, charged each student granted "leave of absence" status, each semester	4.35
Graduation fee	25.00
Returned check fee, charged a student whose check is improperly drafted, incomplete, or returned by the bank for insufficient funds or for any other reason	15.00
Transcript fee, for each transcript of record	2.00
Replacement of lost or stolen picture identification card	2.00

PAYMENT OF FEES

The annual fee of $5,000 for the 1975–76 academic year is payable at the rate of $2,500 on or before registration day for each semester. Students registered for the summer session of fourth-year clerkships will be on "continuous registration" without charge until the following fall semester. No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees are payable at the Office of the Cashier of the University. Checks and postal money orders should be made payable to George Washington University, with student identification number shown in upper left-hand corner.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. While tuition is due and payable in full as described above, a student may sign a deferred payment contract with the Student Accounts Office at the time of registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before October 22, 1975 (for the fall semester), and March 10, 1976 (for the spring semester). Interest at the rate of 8 per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $590 or more. Under such circumstances

the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late payment fee and will be subject to the interest charge of 8 per cent per annum. Accounts which become 30 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits his rights to the use of the deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

After a student has entered the course of instruction he is obligated for the tuition for the full semester. A student registered for the clerkships of the summer session is obligated for tuition due at the time of registration for the following fall semester, except that in the case of withdrawal or leave of absence a *pro rata* payment will become due immediately.

Acceptance by the University of a student's fees does not in any way obligate the School of Medicine and Health Sciences to accept the student for any subsequent semester or summer session, and the right is reserved to require the withdrawal of any student whenever, in the interest of the student or the School, the Executive Committee of the Medical Center deems it advisable to do so.

PROJECTED TUITION INCREASES FOR 1976–80

The maximum tuition for the academic year 1976–77 has been estimated at $12,500. Beginning with the 1976 summer sessions, the maximum University Center fee charged each student granted "leave of absence" status has been estimated at $5, an increase of $0.65; beginning with the academic year 1976–77, the maximum University Center fee has been estimated at $52.50 a semester, an increase of $6.

Every effort will be made to keep tuition and fee increases within these limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment in this estimate.

COST OF TEXTBOOKS AND STUDENT EQUIPMENT

The minimum cost of necessary textbooks and student equipment (microscope, drawing materials, glass slides, clinical thermometer, stethoscope, hemocytometer, uniforms, etc.) is approximately as follows: first year, $700; second year, $400; third year, $200; and fourth year, $200. Microscopes must be provided by the student. Rentals are not available.

PREPAID AND DEFERRED PAYMENT PLANS

Several commercial programs for those who wish to pay for college on a monthly basis are available. Terms and conditions vary, but most provide a life insurance policy in the contract. For specific details and applications, address inquiries to the following:

1. Girard Edu-Check Plan, 2nd and Chestnut Street, Philadelphia, Pa. 19106

2. Richard C. Knight Insured Tuition Payment Plan, 6 St. James Avenue, Boston, Mass. 02100
3. The Tuition Plan, Inc., Concord, N.H. 03301

The University's Office of Student Financial Aid does not maintain a supply of applications for these various programs, but will be happy to provide guidance to students and parents.

REGULATIONS FOR M.D. CANDIDATES

ATTENDANCE

A student is not permitted to attend classes until registration has been completed and fees due have been paid. Regular attendance is required.

GRADES

H—Honors; *P*—Pass; *F*—Failure; *IP*—In Progress; *I*—Incomplete; *W*—Withdraw.

Those students whose performances in a subject, as determined by the department concerned, are of a very high caliber, and who, in addition, have demonstrated those qualities of intellectual curiosity, integrity, and self-discipline which clearly set them apart from the majority of the group, may be assigned the grade of *H* (Honors).

The grade of *P* (Pass) will be assigned to all students who meet the minimum standards of performance in a subject as determined by the department concerned, unless they are entitled to the grade of *H* (Honors).

The grade of *F* (Failure) will be assigned when a student fails to meet the minimum standards of performance in a subject as determined by the department concerned. A student receiving the grade of *F* in any subject may not advance to the work of the following year until he has complied with such recommendations of the Committee on Educational Evaluation as are approved by the Executive Committee of the Medical Center.

The grade of *IP* (In Progress) will be assigned to students in courses which require more than one semester for completion. A single definitive grade will be assigned upon completion of the entire course in a subsequent semester.

The grade of *I* (Incomplete) will be assigned when a student fails to complete all the required work in a course for reasons acceptable to the Associate Dean for Curricular and Student Affairs. A student in the first and second year may not proceed into the work of the following year until a grade of *I* has been removed; if not removed, a grade of *I* will be automatically changed to a grade of *F* (Failure) after one year. A student in the third or fourth year must remove a grade of *I* prior to graduation.

The grade of *W* (Withdraw) will be assigned only when a student is unable to continue in school for reasons acceptable to the Associate Dean for Curricular and Student Affairs (such reasons may *not* include poor scholarship). Such a student may be readmitted, at the discretion of the Associate Dean for Curricular and Student Affairs, within a period of two years, and he may repeat for credit the course or courses in which he had been assigned the grade of *W*.

AUDITING

Students may, with the permission of the instructor, register as an "auditor" in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A student who takes a course as an auditor may not later repeat it for credit.

PROBATION

A student who receives grades of *F* in courses totalling 6 or more semester hours in one semester will be placed on academic probation for the following semester. A student who while on probation receives a grade of *F* in any course will be continued on probation for the following semester.

ACADEMIC DISMISSAL

A student (1) who exceeds three semesters, consecutive or otherwise, on probation; or (2) who receives grades of *F* in courses totalling 14 or more semester hours in any academic year; or (3) who receives grades of *F* in courses totalling more than 20 semester hours of work in the M.D. degree program; or (4) whose academic achievement is otherwise considered unsatisfactory by the Educational Evaluation Committee will not be allowed to continue in the M.D. degree program.

EXAMINATIONS

Examinations, which may be written, oral, or practical, will be held during and/or at the end of each semester.

GRADUATION

Application for Graduation.—Application for graduation must be filed in the Office of the Dean for Academic Affairs, and the fee must be paid at the time of registration for the last semester of the fourth year.

Presence at Graduation.—A candidate is required to be present at the graduation exercises unless written application for graduation *in absentia* is approved by the Dean for Academic Affairs.

FINANCIAL AID

The following fellowships, scholarships, and loan funds are available to students in the School of Medicine and Health Sciences. Unless otherwise specified, inquiries should be directed to the Office of the Dean for Academic Affairs of the Medical Center, George Washington University, 2300 Eye Street, N.W., Washington, D.C. 20037.

FELLOWSHIPS

Wilbur J. and Edith K. Carr Memorial Fellowship Fund (1965).—By bequest of Edith K. Carr, former Trustee of the University. The income from this fund

provides fellowships in surgery, medicine, or medical research at the George Washington University Hospital.

Samuel Jordan Graham Fellowship in Surgery (1961).—By bequest, in memory of Judge and Mrs. Graham. The income from this fund, up to $2,000, may be used to assist students who are pursuing postgraduate study or research, preferably in surgery, at the School of Medicine and Health Sciences.

If no individual is conducting such work or deserving of the award, the income may be used to provide one or more scholarships (to cover tuition and other school expenses deemed appropriate) for students in the School of Medicine and Health Sciences. Application should be filed with the Chairman of the Department of Surgery no later than March 1.

The Lattman Foundation.—Each year the Foundation provides a sum of money to support academic enrichment programs for students who are experiencing academic difficulty.

Robin Miller Research Fellowship (1953).—A $3,000 fellowship established by bequest of Mrs. Robin Miller for the study of cardiovascular diseases.

Henry Rau Foundation Student Fellowship Grant (1967).—Awarded annually to a student in the School of Medicine and Health Sciences for research in cancer and allied diseases at the George Washington University Clinic.

U.S. Public Health Service Training Grants.—Information concerning training grants in fields of the medical sciences is available at the Office of the Dean for Academic Affairs of the Medical Center.

SCHOLARSHIPS

Scholarships awarded to students in the M.D. degree program are credited for the academic year unless otherwise specified. Each holder must carry a full schedule of academic work during the period for which the scholarship is awarded. Applicants should apply on prescribed forms which must be filed in the Office of the Dean for Academic Affairs of the Medical Center no later than March 15 preceding the academic year for which the scholarship is to be awarded.

Achievement Rewards for College Scientists (ARCS) Foundation, Inc., Scholarship.—Awarded to a student on the basis of financial need and superior grades. Candidates must be citizens of the United States.

Armed Forces Health Professions Scholarship Program (1972).—Available to members of the armed forces who qualify under Public Law 92–426. Interested individuals should write to one of the following: (1) Department of the Army, DASG-PTP, Washington, D.C. 20314; (2) Bureau of Medicine and Surgery, Navy Department (Code 3174), Washington, D.C. 20372; (3) ATC/RSOS, Randolph Air Force Base, Texas 78148.

Anna Bartsch Hospital Intern Scholarship (1946).—A partial scholarship established by Dr. Anna Bartsch-Dunne as a memorial to her mother. Awarded to a woman intern in the University Hospital.

Anna Bartsch Medical Student Scholarship (1946).—A partial scholarship established by Dr. Anna Bartsch-Dunne as a memorial to her mother. Awarded to a woman in the School of Medicine and Health Sciences "of outstanding scholarship, character, and promise, who intends to make the practice of medicine her life profession."

Jack I. Bender Scholarship (1967).—A partial scholarship established by the

family of Jack I. Bender as a memorial to their father. Awarded annually to a student on the basis of academic performance and need.

Everett Lamont Bradley Scholarship (1954).—A partial scholarship, by bequest of Alice R. H. Bradley in memory of her son, for a student in the School of Medicine and Health Sciences.

Dr. Edith SeVille Coale Scholarships (1965).—Provided at the request of Dr. Coale for women in the School of Medicine and Health Sciences. The scholarships are administered by the Zonta Club of Washington. Application should be made to the Office of the Dean for Academic Affairs of the Medical Center no later than December 1.

Joseph Collins Foundation Scholarships (1951).—Available to medical students upon application through the Office of the Dean for Academic Affairs of the Medical Center.

Oliver C. Cox Scholarship Fund (1973).—Established in memory of Oliver C. Cox, M.D., "for the establishment, support, and maintenance of endowed scholarships in medicine."

Health Professions Scholarship Program (1966).—Awarded by the School of Medicine and Health Sciences to students who qualify under the provisions of Public Law 89–920. Inquiries should be directed to the Associate Dean for Curricular and Student Affairs.

Joan Luria Hines Scholarship (1968).—Established by friends, students, and faculty of the School of Medicine and Health Sciences as a memorial to the wife of a medical student.

Ki-Wives of Washington Scholarship Fund (1958).—Three tuition scholarships available to students in the School of Medicine and Health Sciences.

Sidney A. Levine Scholarship Fund (1971).—Established to assist medical students on the basis of need and academic performance.

Medical Student Research Scholarships and Traineeships.—For student participation in the research programs of the School of Medicine and Health Sciences or special training in research methods. Research scholarships are ordinarily awarded for full-time activity during the summer months; research traineeships support part-time work during the academic year. Scholars are "matched" with members of the faculty in accordance with their mutual interests. Trainees are designated by the departments responsible for the programs. These programs have been spsonsored by the National Institutes of Health. In addition a number of research scholarships have been made available through the Washington Heart Association.

School of Medicine Scholarship Fund (1948).—Established by gifts of various donors for tuition awards in the School of Medicine and Health Sciences.

David Perry Steinman Memorial Scholarship Fund (1960).—Established by friends and classmates. Awarded annually to a second-year student in the School of Medicine and Health Sciences on the basis of need and academic performance.

James J. Whisman Scholarship (1966).—A partial scholarship by bequest of James J. Whisman for needy and deserving students in the School of Medicine and Health Sciences.

COLUMBIAN WOMEN SCHOLARSHIP FUNDS

The Columbian Women Scholarships are awarded to women students on the basis of financial need and scholastic attainment. Candidates must have com-

pleted a minimum of 15 hours at this University with a minimum *B* (3.0) average, or the equivalent. A letter of application for these scholarships should be addressed to the Chairman, Columbian Women Scholarships, care of the Alumni Office, George Washington University, Washington, D.C. 20052, no later than May 15 for the fall semester, and January 1 for the spring semester. Scholarship aid is awarded from income of the following endowments:

Estelle M. Corbett Scholarship Fund (1973).—A fund of $1,000 for tuition aid.

Jessie Fant Evans Scholarship Fund (1967).—A $10,135 fund for tuition aid, established by bequest of Jessie Fant Evans, former Trustee of the University.

Lewes D. and Myrtie H. Wilson Memorial Scholarship Fund (1926).—A fund of $1,000 for tuition aid, established by Elizabeth Wilson as a memorial to her parents.

LOAN FUNDS

American Medical Association Medical Education Loan Guarantee Program (1960).—Available to medical school students (beyond the first semester of the M.D. degree program).

Catherine Breen Student Loan Fund (1972).—Established by alumni of the School of Medicine and Health Sciences in honor of Miss Catherine Breen, former Assistant to the Dean of the Medical Center. Available to needy students who are candidates for the degree of Doctor of Medicine. Applications should be made to The George Washington University Medical Alumni Association.

Edith K. Carr Medical School Loan Fund (1962).—Established by Mrs. Carr for loans to students in the School of Medicine and Health Sciences.

Health Professions Student Loan Program.—This fund is available to a full-time student pursuing a course of study leading to the degree of Doctor of Medicine. Interns, residents, students engaged in premedical or other professional training, and students enrolled in programs of study other than those leading to the degree mentioned above are *not* eligible for these loans.

A candidate must (1) be a citizen of the United States or have such immigration status and personal plans as to indicate that he intends to become a permanent resident of the United States, (2) be in need of the amount of the loan to be able to pursue his course of study, and (3) be in good standing with the School. Inquiries concerning deadlines and applications should be directed to the Associate Dean for Curricular and Student Affairs.

Joseph H. Himes Loan Fund (1956).—Available for loans to students in the School of Medicine and Health Sciences.

Robert Wood Johnson Foundation Loan Fund (1972).—Available to medical students who are women, members of designated minority groups, or legal residents of counties of less than 50,000 population, and who are citizens of the United States.

W.K. Kellogg Medical School Loan Fund (1942).—Established by W.K. Kellogg Foundation in Battle Creek, Michigan.

Jessie B. Martin Loan Fund (1967).—Established by friends of Mrs. Jessie B. Martin, former Editor of Academic Publications at the University. An emergency fund for loans up to $250, payable prior to ceasing of enrollment, with interest rate of 3 per cent per annum. Application should be made to the Director of the Office of Student Financial Aid.

Pfizer Medical School Loan Fund (1953).—Established by Chas. Pfizer & Co., Inc.

School of Medicine and Health Sciences Loan Fund (1951).—A fund established by medical students and augmented by bequest from the estate of Ethel L. Murray.

Sutherland Medical School Loan Fund (1941).—Established by Rose L. Sutherland.

W.E. Wrather Medical Student Loan Fund (1967).—Established by gift of Mrs. Alice D. Wrather in memory of her husband.

PRIZES

American Medical Women's Association, Inc., Prize.—A certificate awarded annually to each woman ranking academically in the upper 10 per cent of the graduating class. An additional prize of $100 is awarded to a woman who has the highest scholastic ranking in her graduating class.

Samuel M. and Miriam S. Dodek Prize (1967).—Established in memory of Professor Bernhard Zondek, the eminent discoverer of the endocrinology of the human female reproductive cycle. Awarded annually to a member of the graduating class who has attained a commendable knowledge and understanding of the field of female endocrinology.

Allie S. Freed Prize (1957).—Awarded annually to a member of the graduating class who has demonstrated exceptional proficiency in the field of preventive medicine.

Walter Freeman Prize (1966).—Awarded annually to a student in the graduating class who submits the best essay based on original investigation.

Alec Horwitz Prize (1959).—A prize of $100 awarded annually to a senior who has demonstrated exceptional proficiency in the field of surgery.

Oscar Benwood Hunter Prize (1952).—Established by The George Washington University Medical Society, now known as The George Washington University Medical Alumni Association. Awarded annually to a member of the graduating class who has demonstrated outstanding ability in pathology.

Jacobi Medical Society Prize (1962).—Established in memory of Dr. Abraham Jacobi, the founder of pediatrics practice in the United States. Awarded annually to a member of the graduating class who has demonstrated outstanding ability in pediatrics.

Howard Kane-A.F.A. King Obstetrical Society Prize (1937).—Established in memory of Dr. Howard Kane and Dr. A.F.A. King, who served as Professors in the School of Medicine and Health Sciences. Awarded annually to a member of the graduating class who has demonstrated outstanding ability in obstetrics and gynecology.

Lange Medical Publications Prize.—Awarded annually to two members of the graduating class who are considered outstanding by their classmates. The prize consists of the graduate's choice of four books published by Lange Medical Publications.

Huron W. Lawson Prize (1957).—A prize of $100 established by Mrs. Lawson in memory of her husband, who was a distinguished member of the Medical Staff of the University, presented annually to a member of the graduating class who has demonstrated exceptional proficiency in the field of obstetrics and gynecology.

Benjamin Manchester Prize (1966).—Established by a grateful patient in honor of Dr. Benjamin Manchester, clinical professor of medicine. Awarded annually to a member of the graduating class who has an outstanding record and shows promise of real humanitarianism in the practice of medicine.

C.V. Mosby Book Prize.—Awarded annually to four members of the graduating class who are considered outstanding by their classmates. The prize consists of the graduate's choice of a book published by C.V. Mosby Company.

Julius S. Neviaser Prize in Orthopaedic Surgery (1956).—A prize of $100 awarded annually to the senior who scores the highest grade in a written examination and clinical aspects of orthopaedic surgery.

John Ordronaux Prize (1907).—By bequest, $150 awarded annually to the member of the graduating class who has the highest scholastic standing.

Roche Prize.—An Omega watch and a scroll awarded annually to the member of the graduating class who best exemplifies the ideals of the modern American physician. The winner is chosen by vote of the graduating class.

William G. Schafhirt Prize (1966).—By bequest, $200 awarded annually to a senior student for the best original essay or thesis on some medical subject of current public interest.

Upjohn Achievement Prize.—A prize of $200 and an inscribed plaque awarded annually to a member of the graduating class selected by his or her classmates on the basis of outstanding scholastic and personal achievement.

HONOR SOCIETIES

Alpha Omega Alpha.—National Honor Medical Society. Third- and fourth-year candidates for the M.D. degree meeting the qualifications specified by the constitution of the Society are eligible for election to membership.

William Beaumont Medical Society.—Medical students showing unusual ability for medical writing and research are elected by the active members of this society.

Howard Kane-A.F.A. King Obstetrical Society.—The fifteen third- and fourth-year candidates for the M.D. degree who maintain the highest grades in their work in obstetrics are eligible for membership.

Smith-Reed-Russell Society.—M.D. degree candidates of the third and fourth years who have received the grade of *H* (Honors) in courses totaling 40 per cent or more of their total semester hours are eligible for membership.

MEDICAL ETHICS FORUM

The Medical Ethics Forum is a student-founded organization which sponsors an informal series of seminars. Speakers are invited to discuss current ethical questions with which students and doctors are confronted in medical practice and research. In addition, the Forum sponsors symposia to evaluate more thoroughly particularly seminal issues.

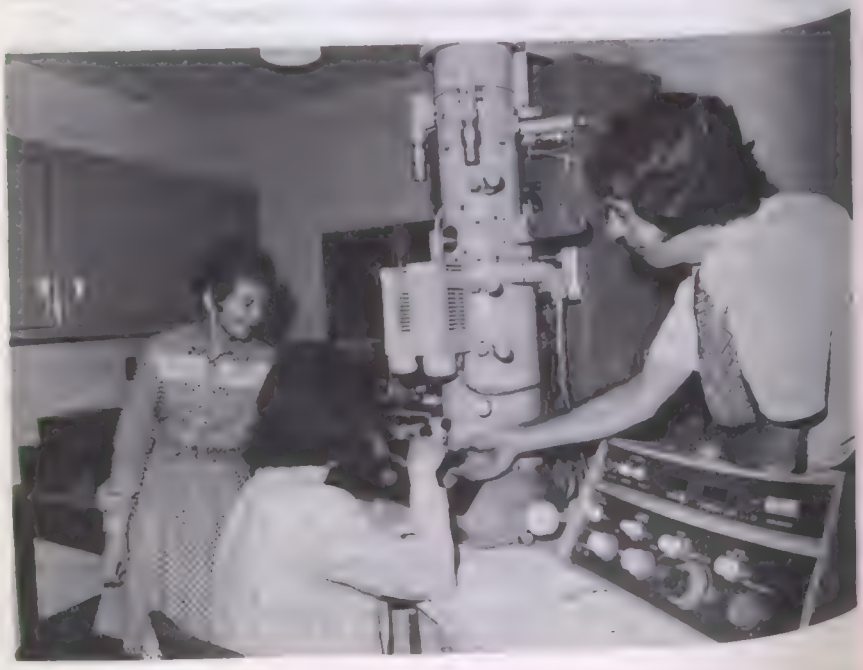
Undergraduate Programs in Allied Health Sciences

PROGRAMS OF STUDY in the allied health sciences at the School of Medicine and Health Sciences include those disciplines and skills that are allied to medicine in the delivery of health care and health education. The faculty of the School recognizes that modern medical practice requires increasing numbers of non-physician health care professionals; that such allied health personnel are appropriately educated in an academic health center; and that new roles for health care providers require the introduction of new curricula in allied health and nursing education.

The purpose of the School's allied health program is to meet the health needs of our community and our society by training appropriate manpower, and to meet the needs of the student who has chosen a career in the health sciences area by providing programs that combine effective training leading to professional skill and competence with sound education leading to continued personal and professional development.

Programs in Allied Health Science are currently offered leading to the degrees of (1) Associate in Science, with areas of concentration in Medical Laboratory Technique, Medical Services Technology, Nuclear Medicine Technology, and Radiologic Technology; and (2) Bachelor of Science in the fields of Environmental Health, Medical Technology, and Radiologic Sciences and Administration, or with designation as Physician's Assistant, Nurse Anesthetist, and Nurse Practitioner.

Certificates are also awarded in the Physician's Assistant, Nurse Anesthetist, and Nurse Practitioner programs.



ADMISSION

The right is reserved to refuse admission to any student with an academic record which creates doubt of his ability to succeed in college, or who, for any other reason, would not be an acceptable student. In the selection process, there is no discrimination because of sex, race, color, creed, or national or regional origin.

An application for admission to degree candidacy should be accompanied by a nonrefundable $10 application fee.* The application fee is waived for a student applying for readmission who was registered as a degree candidate at the time of his last registration at this University and who has not since registered at another institution.

Applicants should submit the application form and complete credentials by June 1. Some programs may require an earlier admissions date.

Forms for application for admission or readmission are available at, and should be returned to, the Office of Admissions, George Washington University, Washington, D.C. 20052.

ADMISSION TO DEGREE CANDIDACY

The following are required for admission to degree candidacy in all Allied Health programs:

1. Graduates of secondary schools must have a diploma based upon an acceptable academic record from an accredited secondary school. Applicants who have not graduated from secondary school must have satisfactory scores on the General Educational Development (GED) High School Level tests.

2. Students who have completed secondary school within two years of the date of their application for degree candidacy and who have not attended any other college or university must have acceptable scores on the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board (CEEB)†; applicants without previous college work who have completed secondary school more than two years before their date of application may substitute acceptable scores on the College-Level Examination (CLEP) or acceptable scores on the General Educational Development (GED) High School Level test.

3. Students who have completed fewer than 12 semester hours of acceptable course work at an accredited college or university before applying for degree candidacy must have a secondary school record and acceptable scores on one of the three examinations listed in item 2 above.

4. Students who have completed 12 or more semester hours of acceptable course work at an accredited college or university must have maintained an over-all quality-point index of 2.00 in course work; they must be in good standing as to scholarship and conduct and be eligible to return to the last previously attended institution in the same semester for which admission is sought to George Washington University. A student who has been academically dismissed or suspended more than twice is ineligible for consideration for at least five years from the date of his last suspension or dismissal.

---

* Application fee must be by check or postal money order, payable to George Washington University.

† The College Entrance Examination Board test is preferred; however, the American College Testing battery (ACT) scores will be accepted.

REQUIRED CREDENTIALS

1. A transcript of secondary school work, or, for students who are not graduates of secondary schools, scores on the General Educational Development test. Transcripts must be forwarded directly from the institution attended to the Office of Admissions. A transcript submitted by the student himself is not acceptable.
2. For applicants who have attended any college, university, or other institution of higher learning, an official transcript forwarded to the Office of Admissions by each institution attended regardless of whether credit was earned or desired.
3. Scores on standardized examinations (ACT, SAT, CLEP, etc.) forwarded by the administering agency directly to the Office of Admissions.
4. Records from service schools.

ADVANCED TUITION DEPOSIT

Upon notification of acceptance, a $100 advanced tuition deposit will be required of all full-time undergraduate students including those readmitted. The deposit is credited toward tuition and is not refundable.

NONDEGREE STUDENTS

A student who wishes to take individual courses in Allied Health programs without applying for degree candidacy must apply for admission to the University as an undergraduate unclassified student in the School of Medicine and Health Sciences. The Associate Dean for Allied Health and the chairman of the department offering the course shall determine whether admission will be granted to nondegree students. Credits earned as a nondegree student may be transferred to degree programs at the University provided the course(s) are applicable to the desired curriculum and the student meets the requirements of the degree program for which application is made.

ADVANCED STANDING

Advanced standing may be awarded for course work taken at other accredited institutions at the college or university level or for nontraditional classroom or clinical experience. Students are reminded, however, that they must satisfy the residence requirement for their degree program (see pages 58, 61) no matter how much advanced standing may be granted.

It is the responsibility of the student to have certified official transcripts of all course work taken at other institutions or the results of examinations sent by the issuing institution or agency directly to the Office of Admissions, George Washington University, Washington, D.C. 20052. If the applicant has fewer than 30 semester hours of acceptable credit (grades of *C* or better on academic work from an accredited institution) at the time the application is submitted, he must have his secondary school record sent directly to the Office of Admissions from the school.

The University reserves the right to refuse credit for transfer in part or in whole, or to allow it provisionally. Credit so given may be withdrawn for subsequent poor work. No time limitation will be placed on the transfer of credits from other institutions in the areas of human competence (language, humanities, social studies, mathematics) or subject competence (biological sciences,

mathematics, or physical sciences which are related to allied health sciences). However, in areas of vocational competence (clinical applications as dictated by individual programs), credit will not be granted for work completed five or more years prior to application unless proficiency and/or continued maintenance of skills are demonstrated.

CREDIT FROM HIGHER INSTITUTIONS

Unlimited advanced standing may be awarded for appropriate course work completed with a minimum grade of *C* or its equivalent at other accredited institutions of higher learning, provided the course is applicable to or comparable with a course in the required curriculum, or the degree program to which the student has been admitted has provisions for elective credit toward which the credit for advanced standing may be applied. Although a grade of *D* is not acceptable for transfer, a course in which a student has received the grade of *D* may be used to satisfy a curriculum requirement. It may not, however, be counted toward the total number of semester hours required for the degree, and it may not be repeated without the approval of the faculty adviser.

CREDIT FOR NONTRADITIONAL CLASSROOM OR CLINICAL EXPERIENCE

Assuming there is no duplication of course work earned, a maximum of 60 semester hours of advanced standing may be awarded on the basis of nontraditional classroom or clinical experience, by a combination of any of the methods listed below:

Credit from Service Schools.—A maximum of 30 semester hours may be obtained on the basis of work satisfactorily completed in military service schools, as evaluated in accordance with the *Guide to the Evaluation of Educational Experiences in the Armed Forces.* No credit will be granted for military experience as such.

Credit through Special Departmental Examinations.—With the approval of the departmental faculty adviser and the department chairmen concerned, permission to take special departmental examinations may be granted to those who are qualified by work experience or background. These examinations may be taken only once, and a satisfactory grade is required for credit to be awarded. A maximum of 30 semester hours of advanced standing may be awarded for these examinations. A fee of $25 for each course examination is charged for preparing, administering, and grading.

Credit for College Entrance Examination Board College-level Examination Program (CLEP).—A maximum of 30 semester hours of advanced standing may be awarded for successful completion of CLEP General and Subject examinations. CLEP Subject Examinations are offered in 29 subject areas. These tests measure achievement in the equivalent of specific college-level courses. (Credit may not be earned by passing the examination after having taken the equivalent course.) CLEP General Examinations are offered in five areas: Mathematics, Social Sciences, Humanities, the Natural Sciences, and English Composition. (Credit—advanced standing—is not given for the General Test in English Composition.) To be eligible to take the CLEP General Examinations, a student must have been out of secondary school for three years or more, and he must not have been enrolled in any regular college program during that time.

Credit for New York State Board of Regent's Examination.—Applicants for

degrees who present proper certification of award of a degree at the Associate's level from the New York State Board of Regents *may* be awarded a maximum of 60 semester hours of advanced standing.

Credit for Correspondence Courses.—A maximum of 30 semester hours of advanced standing *may* be awarded through the successful completion of appropriate correspondence courses offered by accredited colleges and universities.

Credit through United States Armed Forces Institute (USAFI) Examinations.—A maximum of 30 semester hours of advanced standing may be assigned for approved United States Armed Forces Institute college-level examinations passed with satisfactory scores.

Currently registered degree candidates must obtain permission from the Associate Dean for Allied Health Programs before registering to take examinations, correspondence courses, or courses at other accredited institutions.

READMISSION

A student previously registered in the University who was not registered on campus during the immediately preceding semester (summer session excluded), must apply for readmission. If the student applies as a degree candidate and was previously registered as a nondegree student, or if he has attended one or more higher institutions during his absence from the University, he must have complete official transcripts sent to the Admissions Office of this University from each institution attended. Applications for readmission are considered on the basis of regulations currently in effect.

The application fee is waived for a student applying for readmission who was registered as a degree candidate at the time of his last registration at this University and who has not since registered at another institution.

STUDENTS FROM FOREIGN INSTITUTIONS

Application, required records, and scores on the *Test of English as a Foreign Language* (see below) must be received from *foreign applicants* no later than March 1.

REQUIRED RECORDS

Applicants must request all educational institutions attended to send *directly* to the Office of Admissions, George Washington University, Washington, D.C. 20052, official credentials listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from secondary schools and all colleges and universities attended are required. Records of state examinations and certificates are also needed. All records become the property of the University and *cannot* be returned.

LANGUAGE TEST

Students whose native tongue is not English are required to take the *Test of English as a Foreign Language*. Students are responsible for making arrangements for taking the test and should address inquiries to: TOEFL, Educational Testing Service, Princeton, New Jersey 08540, U.S.A. The completed application form should be returned to the Testing Service at Princeton well in advance of the beginning of the semester for which the applicant seeks admission.

The test fee, which should be remitted with the application, entitles the student to have his test score sent to three different institutions. Registration for the *Test of English as a Foreign Language* does *not* constitute application for admission to George Washington University.

The Bulletin of Information, obtainable without charge, contains a description of the test as well as rules regarding application, fees, reports, and the conduct of the test; lists of examination centers; examination dates; and an application blank. On the application for the test, the student should specify that the scores be sent to the Office of Admissions at this University.

In addition to the TOEFL, an admitted student may be required to report to the Admissions Office to make arrangements for taking an English Placement Test for foreign students prior to registration. Results of this test will determine the courses the student will be permitted to register for in his program of study.

FEES AND FINANCIAL REGULATIONS FOR UNDERGRADUATE ALLIED HEALTH STUDENTS

Fees paid by students cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution make up the difference.

The following fees and financial regulations were adopted for the 1975 summer sessions and the academic year 1975–76. (See page 49 for projected tuition increases for 1976–79.)

Tuition Fees

Full-time on-campus program (12 or more hours), each semester	$1,250.00
Part-time on-campus program, for each semester hour	94.00

University Center Fee (charged all students registered on campus, nonrefundable)

For students registered for 11 or more semester hours on campus: Each semester	46.50
For students registered for less than 11 semester hours in a semester on campus: For each semester hour for which the student registers	4.35
For students maintaining "continuous registration" status: Each semester	4.35

Additional Course Fees

In certain courses offered by Columbian College of Arts and Sciences, additional fees, such as laboratory and material fees, are charged as indicated in the course descriptions in the *Undergraduate and Graduate Catalogue*. These fees are charged by the semester and, unless otherwise indicated, may be defrayed in two payments when the tuition is paid in this manner. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee, the individual student will be required to pay such additional charges as are determined by the department concerned.

Graduation Fees

Associate in Science	$10.00
Bachelor of Science	25.00

Residence Hall Fees (see page 14)

Special Fees and Deposits

Application fee	$10.00
Advanced tuition deposit, nonrefundable, charged each entering or readmitted full-time undergraduate student	100.00
Housing deposit, nonrefundable, charged each applicant for residence hall space	100.00
Late-registration fee, for failure to register within the designated period	15.00
Late-payment fee, for failure to make payments when due (see "Payment of Fees," pages 49–50)	15.00
Financial reinstatement fee, for reinstatement after financial encumbrance for non-payment of fees (see "Payment of Fees," pages 49–50)	35.00
Returned check fee, charged a student whose check is improperly drafted, incomplete, or returned by the bank for insufficient funds or for any other reason	15.00
Continuous Registration fee, to maintain "continuous registration" status during any semester of absence from the University or after completion of tuition requirements*—due and payable on the official days of registration	94.00
For special physical examination	2.00
Special Columbian College of Arts and Sciences departmental examination for each course to qualify for receiving credit (advanced standing), waiver of requirement, or both	25.00
For each examination to qualify for advanced standing and for each special examination	5.00 5.00
English test for foreign students (when required)	3.00
Laboratory checkout fee, for failure to check out of Chemistry laboratory by the date deadline set by the instructor†	2.00
Transcript fee, for each transcript of record	2.00
Replacement of lost or stolen picture identification card	

Registration for on-campus courses in the University entitles each student to the following University privileges: (1) the services of the Student Career Services Office; (2) the use of the University Library; (3) gymnasium privileges; (4) admission to all athletic contests, unless otherwise specified; (5) subscription to the *University Hatchet*, the student newspaper; (6) admission to University debates; (7) medical attention as described under Student Health Service. These privileges terminate when the student withdraws or is dismissed from the University.

---

* Payment of the continuous registration fee entitles the student who is granted leave of absence to return and continue his work toward a degree under the academic requirements which were in force at the time of his first registration. The continuous registration fee applies toward neither tuition fee nor residence requirements for the degree.

This fee does not apply to students granted military leave, see page 54.

† A student who drops a Chemistry course before the end of the semester must check out of the laboratory at the next laboratory period.

PROJECTED TUITION AND FEE INCREASES 1976–79

So that students and their parents may plan more realistically for a total four-year period, tuition increases for the academic years 1976–77, 1977–78, and 1978–79 have been estimated as follows:

Increase by year (full-time undergraduate students):

1976–77	$100.00
1977–78	200.00
1978–79	200.00

*Increase by semester hour (graduate and part-time undergraduate students):

1976–77	$4.00
1977–78	7.00
1978–79	5.00

The University Center fee will be increased for the 1976 summer sessions and the academic year 1976–77. For students taking 11 or more semester hours, the maximum fee will be $52.50 a semester, an increase of $6. Students taking less than 11 semester hours will pay a maximum of $5 a semester hour, an increase of $0.65.

Every effort will be made to keep tuition increases within the above limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment in these estimates.

PAYMENT OF FEES

No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees for each semester are due and payable in full at the Office of the Cashier at the time of each registration. Checks and postal money orders should be made payable to George Washington University, with the student identification number in the upper left-hand corner.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for 6 semester hours or more may sign a deferred payment contract with the Student Accounts Office at the time of each registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before October 22, 1975 (for the fall semester), and March 10, 1976 (for the spring semester). No deferred payment is permitted for the summer session. Interest at the rate of 8 per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $590 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically

*Semester-hour increases become effective at the beginning of the summer sessions preceding the academic year.

charged a $15 late-payment fee and will be subject to the interest charge of 8 per cent per annum. Accounts which become 30 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

PREPAID AND DEFERRED PAYMENT PLANS

Several commercial programs for those who wish to pay for college on a monthly basis are available. Terms and conditions vary, but most provide a life insurance policy in the contract. For specific details and applications, address inquiries to the following:

1. Girard Edu-Check Plan, 2nd and Chestnut Streets, Philadelphia, Pa. 19106
2. Richard C. Knight Insured Tuition Payment Plan, 6 St. James Avenue, Boston, Mass. 02100
3. The Tuition Plan, Inc., Concord, N.H. 03301

The University's Office of Student Financial Aid does not maintain a supply of applications for these various programs, but will be happy to provide guidance to students and parents.

WITHDRAWALS AND REFUNDS*

Applications for withdrawal from the University or for change in class schedule must be made in writing to the Associate Dean for Allied Health Programs. Notification to an instructor is not an acceptable notice (see "Withdrawal," page 53.)

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

1. *Complete withdrawal from the University:*

FALL SEMESTER

Withdrawal dated on or before September 5, 1975	90 per cent
Withdrawal dated September 8 to September 19, 1975	75 per cent
Withdrawal dated September 22 to October 3, 1975	50 per cent
Withdrawal dated after October 3, 1975	none

SPRING SEMESTER

Withdrawal dated on or before January 23, 1976	90 per cent
Withdrawal dated January 25 to February 6, 1976	75 per cent
Withdrawal dated February 8 to February 20, 1976	50 per cent
Withdrawal dated after February 20, 1976	none

2. For a *change in status from full-time to part-time student* or for *partial with-*

* Regulations concerning withdrawal and refunds for the summer sessions are stated in the *Summer Sessions Catalogue*.

drawal by a part-time student, the above schedule applies to the difference in charges between the original program and the adjusted program continuing in effect.

3. A student enrolled in an undergraduate full-time program who drops or adds a course and continues to be in a full-time program will have no financial adjustments of tuition made other than those involving course fees.
4. A student who is granted military leave before completing the semester will receive credits for current charges in accordance with the schedule for complete withdrawal from the University (see No. 1 above). Payments made in excess of the nonrefundable balance will be refunded to the student. The nonrefundable balance will be maintained as a deferred credit for use by the student when he returns to the University (see "Military Leave," page 54).
5. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

In no case will tuition be reduced or refunded because of absence from classes.

Payment applies only to the semester for which a registration charge is incurred and will not be credited to another semester (exception: students granted military leave, see page 54).

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

REGULATIONS FOR UNDERGRADUATE ALLIED HEALTH STUDENTS

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. He may attend only those classes for which he is registered. Regular attendance is expected. A student may be dropped from any course for undue absence.

SCHOLARSHIP

A student who fails to maintain the scholarship requirements of the School of Medicine and Health Sciences may be dismissed from the University.

GRADES

Grades are mailed to the student through the Office of the Registrar at the close of each semester. They are not given out by instructors.

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Satisfactory; *D*, Low Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal. In certain courses, an alternate grading system of *CR* (Credit) and *NC* (No Credit) may be used. Except for courses which specifically state that repetition for credit is permitted, a candidate for a degree at this University may not repeat for credit a course in which he has received a grade of *D* or better, unless required to do so by the department concerned. A written statement to this effect must be submitted to the Registrar by the appropriate department chairman.

INCOMPLETE/AUTHORIZED WITHDRAWAL

Whenever a grade has not been assigned, the symbol *I* (Incomplete) or the symbol *W* (Authorized Withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given the instructor for the student's failure to complete the required work of the course. At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond his control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course which is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, he may initiate an appropriate grade change. A grade of *I* automatically becomes a grade of *F* one calendar years after the date of the last class meeting in the semester for which the grade of *I* was assigned.

THE QUALITY-POINT INDEX

Scholarship is computed in terms of the quality-point index, obtained by dividing the number of quality points by the number of semester hours for which the student has registered, both based on his record in this University. Quality points are computed from grades as follows: *A*, four points; *B*, three points; *C*, two points; *D*, one point; *F*, no points, for each semester hour for which the student has registered. Courses in which the grades of *W* or *I* are assigned are not considered in determining the index, except that a course in which the grade of *I* has been assigned will be considered when a formal grade has been recorded. Grades earned at other institutions are not considered in computing the quality-point index.

DEAN'S HONOR LIST

Students who achieve a quality-point index of 3.50 or higher are placed on the Dean's Honor List for that semester. Appearance on the list is limited to full-time students registered for a minimum of 12 semester hours and part-time students registered for a minimum of 12 semester hours over two consecutive semesters, which may include a summer term.

PROBATION

A student who has attempted a minimum of 12 semester hours of course work and whose cumulative quality-point index is below 2.00 is placed on probation for the period in which he or she next attempts 12 additional semester hours of work. A student whose attendance or conduct has been unsatisfactory is placed on disciplinary probation for the period in which he or she next attempts 12 additional semester hours of work.

SUSPENSION

A student whose quality-point index remains below 2.00 after a 12-semester-hour period of probation is suspended.

A student suspended for poor scholarship may not register for course work, even as an auditor. The student may apply for readmission after the lapse of either the fall or spring semester following suspension. Evidence must then be presented to the chairman of the department concerned demonstrating a better qualification to pursue college-level course work. A student suspended twice for poor scholarship may not be readmitted after the second suspension.

WITHDRAWAL

Withdrawal from a course or from the University requires the permission of the Associate Dean for Allied Health Programs. Permission to withdraw from the University will not be granted a student who does not have a clear financial record (see "Withdrawals and Refunds," pages 50–51).

All charges for courses dropped without the approval of the Associate Dean for Allied Health Programs must be met by the student. Reporting the dropping of a course to an instructor does not effect its discontinuance.

CHANGES IN PROGRAM OF STUDY

Changes within the School of Medicine and Health Sciences' Allied Health Programs.—A student may not substitute one course for another, drop courses (see "Withdrawal," above), change his status from credit to audit or audit to credit without the approval of the Associate Dean for Allied Health Programs.

Change from one section to another of the same course may be made with the approval of the Associate Dean for Allied Health Programs and the chairman of the department concerned.

Change from one area of concentration to another within the School of Medicine and Health Sciences may be made with the approval of the Associate Dean for Allied Health Programs. All requirements of the course of study to which the change is made must be met.

Transfer within the University.—Application for transfer to another college, school, or division must be made to the Office of Admissions.

A maximum of 45 semester hours earned in the Division of University Students may be applied toward a Bachelor's degree in the School of Medicine and Health Sciences.

CREDIT

Credit is given only after registration for a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the several colleges, schools, and divisions.

Auditing.—A person who has been admitted to the University may be registered, with the permission of the instructor, as an "auditor" in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit.

SUMMER SCHOOL CREDIT

A student who plans to attend summer school at another institution and apply credit so earned toward graduation from this University must first secure the

written approval of the Associate Dean for Allied Health Programs. In no event will credit in excess of what might be earned in a similar period in this University be recognized.

BALANCE SHEET

On request, the Associate Dean for Allied Health Programs will issue to undergraduate degree candidates a balance sheet showing the amount of work completed and the requirements remaining to be met for the degree. A second balance sheet is issued only if the student changes major or degree objectives.

TRANSCRIPTS OF RECORD

Official transcripts of student records are issued on request of the student or former student who has a clear financial record. A fee of two dollars is charged for each transcript.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until *all* degree requirements are satisfied. Students who have completed course registration must maintain continuous registration by paying the "continuous registration" fee (see page 48). By failing to register for one semester or more, the student breaks his registration and must be readmitted (see "Readmission," page 46). A "readmitted student" is required to satisfy the curriculum requirements existing at the time of his readmission.

Students must be registered during the summer if they are taking courses or are expecting to graduate at the end of the Summer Sessions.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of active duty, upon presentation to his dean of a copy of his orders and a petition for such leave. The maintenance of "continuous registration" is not required of the student on military leave; however, he must apply for readmission to the University well in advance of the semester in which he expects to return. Payments for tuition and fees which are not refunded to the student at the time he is granted military leave will be maintained as a deferred credit for his account and use upon his return to the University.

GRADUATION REQUIREMENTS

Degrees are conferred in February, May, and September.

To be recommended by the Faculty for graduation a student must have met the admission requirements of the college or school in which he is registered; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which he is registered; and be free from all indebtedness to the University. Registration, either for course work or on the "continuous registration" fee basis, is required for the semester or summer session immediately preceding the awarding of a degree.

Application for Graduation.—An "Application for Graduation" form *must* be filed and the appropriate fee paid at the time of registration for the last semester or summer session of the senior or final year. Students completing de-

gree requirements during the Summer Sessions will be awarded diplomas (no formal convocation) September 30, *provided* they have completed all degree requirements and have applied for graduation as a part of registration for the Summer Sessions.

Scholarship.—The student must meet the scholarship requirements for the particular degree for which he is registered.

Curriculum.—Minimum curriculum requirements for each degree are stated on page 55–56, 59.

Residence.—A minimum of 18 semester hours of course work in the area of concentration for the Associate in Science degree and a minimum of 30 semester hours of course work in the area of concentration for the Bachelor of Science degree must be completed while registered in the School of Medicine and Health Sciences. This requirement applies to students transferring within the University as well as to students transferring from other institutions.

Attendance and Conduct.—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

WITH DISTINCTION

In all undergraduate divisions of the University the degree may be conferred "With Distinction," at the discretion of the faculty, if a student meets the specific requirements of his college or school.

Students in the Allied Health Sciences programs must have a quality-point index of 3.50 or higher in all course work taken at this institution. To be eligible a student must have completed at this institution at least one-half of the courses required for the degree.

FINANCIAL AID

The George Washington University has, for full-time undergraduate students, a program of financial assistance consisting of scholarships, loans, grants, part-time employment, or any combination of these resources. The University participates in the National Direct Student Loan, Supplemental Educational Opportunity Grant, and College Work-Study programs. Financial aid is awarded on the basis of the student's scholastic record, financial need, and qualities of leadership. Complete information concerning financial assistance is available from the Office of Student Financial Aid, George Washington University, Washington, D.C. 20052.

REQUIREMENTS FOR THE DEGREE OF ASSOCIATE IN SCIENCE

The satisfactory completion of a minimum of 60 semester hours of course work is required for the degree of Associate in Science; however, some departments may set the requirements above the minimum. The course work must be distributed as follows:

1. **Human Competence**

   A minimum of 6 semester hours in English Composition (Engl 9 or 10, and 11 or 12), plus a minimum of 6 semester hours of meaningful initiation into the humanities, mathematics, or social studies.

2. **Subject Competence**
   The number of semester hours required depends on the student's specific area of concentration. However, students must elect courses related to allied health sciences in biological sciences, mathematics, or physical sciences. (Students may not use the same mathematics courses to satisfy both the human competence (see above) and subject competence requirements.)

3. **Vocational Competence**
   A minimum of 30 semester hours in vocational competence skills related to the area of concentration.

4. **Elective**
   The number of elective hours depends on the number of semester hours of specific required courses the student has in his program of study; in some programs the student may be allowed to choose electives, but in others he may be required to elect specific courses.

Students who plan to pursue a Bachelor's degree are advised to plan their Associate's degree program so that they will satisfy the prerequisites to the degree of their choice.

SCHOLARSHIP REQUIREMENTS

An over-all quality-point index of 2.00 is required for course work leading to the degree of Associate in Science. A quality-point index of 2.50 is required for course work in the student's area of concentration. See pages 51–52 for explanation of the grading system and the quality-point index.

RESIDENCE REQUIREMENT

A minimum of 18 semester hours of course work in the area of concentration must be satisfactorily completed in residence in the School of Medicine and Health Sciences.

MEDICAL LABORATORY TECHNIQUE PROGRAM

The program of study leading to the degree of Associate in Science with a concentration in Medical Laboratory Technique is offered only to military students off campus.

ADMISSION TO DEGREE CANDIDACY

General requirements for admission to degree candidacy are stated on pages 43–44. Mature students who do not meet these requirements *may* be considered for degree candidacy after the satisfactory completion of a probationary period of 15 semester hours of course work taken in residence at George Washington University with a minimum quality-point index of 2.50. The qualifying course work must include 9 semester hours in biological sciences, chemistry, or mathematics, and 6 semester hours in at least two other areas.

DEGREE REQUIREMENTS

The satisfactory completion of a minimum of 61 semester hours of course work is required:

Nonclinical Course Work	Semester Hours
Engl 9 or 10, and 11 or 12 (or equivalent)	6
Math 3 and 6 (or equivalent)	6
Chem 9 or 11 (or equivalent)	4
	16
Clinical Course Work	
Path 11, 12, 13, 14, and 15	45
Total	61

MEDICAL SERVICES TECHNOLOGY PROGRAM

The program of study leading to the degree of Associate in Science with a concentration in Medical Services Technology is currently available only to military personnel at off-campus military installations.

ADMISSION TO DEGREE CANDIDACY

General requirements for admission to degree candidacy are stated on pages 43–44. Mature students who do not meet these requirements *may* be considered for degree candidacy after the satisfactory completion of a probationary period of 15 semester hours of course work taken in residence at George Washington University with a minimum quality-point index of 2.50. The qualifying course work must include 9 semester hours in the field of epidemiology and environmental health and 6 semester hours in at least two other departments.

DEGREE REQUIREMENTS

The satisfactory completion of 62 semester hours of course work is required:

Courses Outside the Area of Concentration	Semester Hours
Engl 9 or 10, and 11 or 12 (or equivalent)	6
Psyc 1 or Soc 1	3
Elective (to be selected in consultation with the adviser)	6
	15
Area of Concentration	
HCS 10, 11, 15, 16, 22, 67, 68, 92, 93, 94, 95, 96	47
Total	62

NUCLEAR MEDICINE TECHNOLOGY PROGRAM

The program of study leading to the degree of Associate in Science with a concentration in Nuclear Medicine Technology is offered both on and off campus.

ADMISSION TO DEGREE CANDIDACY

General requirements for admission to degree candidacy are stated on pages 43–44. A personal interview or a letter of recommendation may be required for some students. Mature students who do not meet the standard requirements may be considered for admission to degree candidacy after the satisfactory completion of a probationary period of 15 semester hours of course work taken in residence at George Washington University with a minimum quality-point index of 2.50.

DEGREE REQUIREMENTS

The satisfactory completion of 60 semester hours of course work is required:

	Semester Hours
Courses Outside the Area of Concentration	
Engl 9 or 10, and 11 or 12 (or equivalent)	6
Social Sciences (as determined by the faculty adviser; Psyc 1 recommended)	3
Humanities (selected from Art, Music, Philosophy, or Religion)	3
	12
Area of Concentration	
Rad 43, 44, 55, 56, 57, 58, 59, 65, 66, 72, 75, 81, 82, 93, 94, 98	48
Total	60

RADIOLOGIC TECHNOLOGY PROGRAM

The program of study leading to the degree of Associate in Science with a concentration in Radiologic Technology is offered only to military students off campus.

ADMISSION TO DEGREE CANDIDACY

General requirements for admission to degree candidacy are stated on pages 43–44. A personal interview or a letter of recommendation may be required for some students. Mature students who do not meet the standard requirements may be considered for admission to degree candidacy after the satisfactory completion of a probationary period of 15 semester hours of course work taken in residence at George Washington University with a minimum quality-point index of 2.50.

DEGREE REQUIREMENTS

The satisfactory completion of 61 semester hours of course work is required:

	Semester Hours
Courses Outside the Area of Concentration	
Engl 9 or 10, and 11 or 12 (or equivalent)	6
Social Sciences (as determined by the faculty adviser)	3
Humanities (as determined by the faculty adviser)	3
	12

Area of Concentration

Rad 40, 41, 42, 50, 51, 60, 61, 62, 70, 71, 80, 90, 95, 96, 97, 99	49
Total	61

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE

The satisfactory completion of a minimum of 120 semester hours of course work is required for Bachelor of Science programs; however, some departments may set the requirements above the minimum. The course work must be distributed as follows:

1. **Human Competence**

   A minimum of 6 semester hours in English Composition (Engl 9 or 10, and 11 or 12) plus 24 semester hours in meaningful initiation into any two of the three general areas of the humanities, mathematics, or social studies.

2. **Subject Competence**

   A minimum of 30 semester hours of didactic information related to the allied health sciences. This requirement may include the biological sciences, mathematics, or the physical sciences.

3. **Vocational Competence**

   A minimum of 60 semester hours in vocational competence skills related to the area of concentration.

SCHOLARSHIP REQUIREMENTS

An over-all quality-point index of 2.00 is required for course work in programs leading to the Bachelor of Science degree. A quality-point index of 2.50 is required for course work in the student's area of concentration. See pages 51–52 for explanation of the grading system and the quality-point index.

RESIDENCE REQUIREMENT

A minimum of 30 semester hours of course work in the area of concentration must be satisfactorily completed in residence in the School of Medicine and Health Sciences.

ENVIRONMENTAL HEALTH PROGRAM

The Bachelor of Science curriculum in Environmental Health is designed to provide students with the requisite training to function effectively as Environmental Health Officers in domestic and foreign areas. Candidates are prepared for participation in community or regional program planning, community education, staff personnel training, and supervision in official or voluntary health organizations.

RESIDENCE

See above for general residence requirement. Candidates for the degree of Bachelor of Science in the field of Environmental Health must complete the last 30 semester hours in residence, including at least 12 hours in Epidemiology and Environmental Health courses, unless special permission is granted to take work elsewhere. This requirement applies to students transferring within the University as well as to students transferring from other institutions.

DEGREE REQUIREMENTS

The satisfactory completion of a minimum of 120 semester hours, as outlined below, is required for the degree of Bachelor of Science in the field of Environmental Health:

FIRST AND SECOND YEARS

	Semester Hours
Communications	
Engl 9 or 10, and 11 or 12	6
Engl 20; SPDR 111 or 121	6
Humanities	
Twelve semester hours selected from the following: Art 31–32, 71–72; Engl 43–44, 45–46, 51–52, 71–72, 91–92; Foreign Language (2 years of one language); Phil 50	12
Natural and Mathematical Sciences	
BiSc 11–12, Chem 11–12	16
Six semester hours selected from the following: Math 3, 6, 9, 10, 30, 31, 51, 52; Stat 51, 101–2	6
Social Studies	
Six semester hours selected from one of the following combinations: Anth 1–2; Econ 1–2; Psyc 1 and 8, Psyc 1 and 22; or Soc 1 and 2	6
Elective (selected with the approval of the adviser)	8
	60

THIRD AND FOURTH YEARS

Concentration Requirements (to be selected, in consultation with the adviser, from the following courses)	30
Environmental Sanitation—HCS 102, 103, 104, 105	
Public Health Epidemiology—HCS 121, 122, 123, 124	
Public Health Entomology—HCS 121, 156, 158, 159	
Public Health Microbiology—Micr 151, 152, 153, 154	
Occupational Health—HCS 193, 194	
Public Health Administration—HCS 191, 192	
Practicum Requirement (This requirement may be waived with the approval of the Department; however, students will be required to substitute 12 semester hours of approved courses.)	12
HCS 180	

Elective

100-level courses in two or more related departments in consultation with the faculty adviser, selected from Anthropology, Biological Sciences, Chemistry, Geology, Psychology, and Sociology	18
Total	120

MEDICAL TECHNOLOGY PROGRAM

The satisfactory completion of 120 semester hours of course work is required for the degree of Bachelor of Science in the field of Medical Technology.

RESIDENCE REQUIREMENT

A minimum of 60 semester hours must be spent in residence for the degree of Bachelor of Science in the field of Medical Technology, including the 12-month Medical Technology program at the University Hospital in the fourth year (Path 115–16, 117–18, 119–20).

CURRICULUM

FIRST TWO YEARS

		Semester Hours
Engl:	Engl 9 or 10, and 11 or 12	6
Humanities:	Six semester hours selected from one of the following combinations: Art 31–32; Art 71–72; Engl 51–52; Engl 71–72; Engl 91–92; Mus 3 and 4; Rel 9 and 10; or Rel 59–60	6
Math:	Math 3, 6	6
	NOTE: the Math 3 requirement may be satisfied by offering two years of high school algebra acceptable for admission; the Math 6 requirement may be satisfied by offering one-half year of high school trigonometry acceptable for admission.	
Science:	BiSc 11–12, 111	12
	Chem 11–12, 22	12
Social Studies:	Six semester hours selected from one of the following combinations: AmCv 71–72; Anth 1–2; Econ 1–2; Geog 51 and 52; Hist 39–40; Hist 71–72; PSc 4 and 6; PSc 5 and 6; or Soc 1 and 2	6
Elective:	Courses other than science	12
		60

THIRD YEAR

Chem 50	4
Four semester hours selected from BiSc 104, 127, 148, 154, 163 and 164, or 165	4
Elective (courses other than science)	22
	30

FOURTH YEAR

Path 115–16	2
Path 117–18	8
Path 119–20	20
	30
Total	120

The fourth-year courses constitute the major. Each candidate must make application to take the 12-month Medical Technology program at the University Hospital; this should be done early in the third year. Although admission to the degree program does not assure acceptance into the Medical Technology program at the Hospital, George Washington University students are given preference. A number of scholarships are provided by the University Hospital for students in the fourth year of the degree program.

PHYSICIAN'S ASSISTANT PROGRAM

The program leading to the degree of Bachelor of Science with designation as Physician's Assistant requires the satisfactory completion of 120 semester hours of course work.

ADMISSION TO DEGREE CANDIDACY

The general requirements for admission to degree candidacy are stated on pages 43–44. Three letters of recommendation and a personal interview are also required.

SCHOLARSHIP REQUIREMENTS

Scholarship requirements are stated on page 56. Candidates for the degree of Bachelor of Science with a designation as Physician's Assistant must maintain an overall quality-point index of 2.00 for course work taken in the Physician's Assistant program. A quality-point index of 2.50 is required for those courses in the core curriculum (area of concentration).

RESIDENCE REQUIREMENT

A minimum of 75 semester hours in the preclinical and clinical portion of the Bachelor of Science degree curriculum must be completed in residence at the School of Medicine and Health Sciences.

DEGREE REQUIREMENTS

All students must complete the 30-semester-hour requirement in the area of human competence (see page 59). The subject and vocational area require-

ments are satisfied by the completion of a 90-semester-hour sequence of required and elective courses, distributed as follows:

	Semester Hours
1. Basic Health Sciences (18 weeks)	
HCS 101: Normal Structure and Function of Man	9
HCS 109: Human Behavior I	2
HCS 113: Medicine and Society	1
HCS 116: Medical Terminology	2
HCS 119: Introduction to Patient Care I	1
	15
2. Clinical Health Sciences (26 weeks)	
*HCS 125: Manifestations of Disease	8
HCS 131: Human Behavior II	2
*HCS 134: Introduction to Patient Care II	3
HCS 140: Clinical-Pathological Correlation	0
HCS 146: Animal Surgery	3
HCS 147: Introduction to Radiology	2
HCS 148: Introduction to Electrocardiography	2
HCS 150: History-taking Review and Theory	0
HCS 151: Clinical Pharmacology	2
HCS 152: Introduction to Basic Laboratory Medicine	3
Micr 128: Microbiology for New Health Practitioners	2
Path 129: Pathology for New Health Practitioners	2
Phar 158: Pharmacology for New Health Practitioners	2
	31
3. Clinical Clerkship (48 weeks)	
*HCS 160: Medical Inpatient	4
*HCS 163: Medical Outpatient	4
HCS 166: Surgical Inpatient	4
HCS 169: Obstetrics and Gynecology	4
*HCS 172: Pediatric Outpatient	4
*HCS 175: Primary Care Preceptorship	12
HCS 178: Emergency Medicine	4
HCS 198: Psychiatric Outpatient	4
HCS 199: Independent Study	4
	45

CERTIFICATE

A certificate is awarded upon completion of the 90-semester-hour sequence of required and elective courses in Health Care Sciences.

NURSE ANESTHETIST PROGRAM

ADMISSION TO DEGREE CANDIDACY

The general requirements for admission to degree candidacy are stated on pages 43–44. Candidates for the degree of Bachelor of Science with designation as Nurse Anesthetist must also fulfill the following requirements:

* Area of concentration courses. See "Scholarship Requirements," page 56.

1. They must have graduated from a National League of Nursing accredited school of nursing.
2. They must be licensed as a registered professional nurse in at least one state or the District of Columbia.
3. They must satisfy the requirements of a school of anesthesia at an affiliated hospital.

ADVANCED STANDING

General provisions for advanced standing are stated on pages 44–46. In addition, students in the Nurse Anesthetist Bachelor's degree program may be granted advanced standing for the following:

1. Students who hold a Bachelor's degree in nursing may receive up to 60 semester hours' credit: (a) 30 hours' credit for vocational skills and/or completion of the National League of Nursing examination in medical-surgical nursing; and (b) 30 hours' credit in subjects relating to human competence, which must include a minimum of 6 semester hours in English and meaningful initiation into two areas selected from among language, social studies, humanities, and general mathematics.
2. Students who are graduates of nursing schools which award some type of diploma other than a Bachelor's degree will receive 30 semester hours' credit for nursing school (vocational) skills on completion of the National League of Nursing examination on medical-surgical nursing (Parts I and II). These students may also receive credit on an individual basis for course work in the area of human competence which they have earned at an accredited college or university.

DEGREE REQUIREMENTS

The satisfactory completion of a minimum of 120 semester hours is required for the degree of Bachelor of Science with designation as Nurse Anesthetist. However, since all students enter the program with a minimum of 30 semester hours of advanced standing (see Nos. 1(a) and 2 above), the number of hours actually completed at this University will be 90 or less. Thirty semester hours in the area of vocational competence are required, consisting of the following courses: Anat 115; Anes 190, 191, 192, 193; Phar 21, 22, 110, 120; Phyl 115. In addition, students must complete a minimum of 9 semester hours in clinical anesthesiology (Anes 194).

CERTIFICATE

Students who do not wish to apply for degree candidacy may qualify for a Certificate in Nurse Anesthesia by satisfactorily completing a 21-semester-hour program consisting of the following courses: Anat 115; Anes 192, 193; Phar 21, 22, 110; Phyl 115.

NURSE PRACTITIONER PROGRAM

ADMISSION TO DEGREE CANDIDACY

The general requirements for admission to degree candidacy are stated on pages

43–44. Candidates for the degree of Bachelor of Science with designation as Nurse Practitioner must also fulfill the following requirements:

1. They must have been graduated from a school of nursing with an over-all quality-point index of at least 2.00 or the equivalent.
2. They must be licensed as registered nurses in at least one state or the District of Columbia.
3. They must have had a minimum of three years' experience in nursing practice in hospital and ambulatory settings.
4. They must have three letters of recommendation forwarded from employers, supervisors in the health field, and/or acquaintances.

Preference will be given to applicants who have made arrangements with a physician or an institution to be employed as a nurse practitioner. Both the physician or institution and the applicant must agree to participate in the program.

ADVANCED STANDING

General provisions for advanced standing are stated on pages 44–46. In addition, students in the Nurse Practitioner Bachelor's degree program may receive up to 30 semester hours of advanced standing in the area of vocational competence for successful completion of the National League for Nursing examination in medical-surgical nursing or for clinical training in a nursing education program. No advanced standing will be granted in the required 46-semester-hour area of concentration.

RESIDENCE REQUIREMENT

A minimum of 46 semester hours of course work in the area of concentration must be completed in residence in the School of Medicine and Health Sciences.

DEGREE REQUIREMENTS

The satisfactory completion of a minimum of 120 semester hours is required for the degree of Bachelor of Science with designation as Nurse Practitioner, distributed as follows:

1. 30 semester hours of course work in the area of Human Competence, including Engl 9 or 10, and 11 or 12, and 6 semester hours of meaningful initiation into two of these areas—social studies, humanities, and mathematics.
2. 30 semester hours of course work in the area of subject competence, including 21 hours in the physical or natural sciences and 3 hours in the mathematical sciences, the latter in addition to any mathematics course taken to satisfy the vocational competence requirement.
3. 60 semester hours in the area of vocational competence, including a 37-week sequence in the 46-semester-hour area of concentration, consisting of the following courses: HCS 109, 119, 125, 134, 137, 140, 142, 143, 144, 153, 154, 157, 163, 179, Micr 128, Path 129, Phar 158.

CERTIFICATE

Nurse Practitioner certification will be granted to those students who meet the

requirements for admission to the degree program and who complete the 46-semester hour area of concentration without completing the remainder of the requirements for the Bachelor of Science degree.

RADIOLOGIC SCIENCES AND ADMINISTRATION PROGRAM

The program leading to the degree of Bachelor of Science in the field of Radiologic Sciences and Administration requires the satisfactory completion of a minimum of 120 semester hours of course work. Students may specialize in Diagnostic Radiology, Nuclear Medicine, or Radiation Therapy.

ADMISSION TO DEGREE CANDIDACY

The general requirements for admission to degree candidacy are stated on pages 43–44. A letter of recommendation from the principal or dean of the school previously attended and a personal interview are also required.

ADVANCED STANDING

General provisions for advanced standing are stated on pages 44–46. Students in the Radiologic Sciences and Administration program (1) who have completed study within the last five years at an accredited radiologic technology, radiotherapy, or nuclear medicine technology school; (2) who are certified by the Council on Medical Education of the American Medical Association upon recommendation of the Joint Review Committee on Educational Programs in Radiologic Technology; and (3) who have a quality-point index of at least 2.50 or a grade average of at least 80 per cent may be granted up to 49 semester hours of advanced standing credit, depending on the specialty.



SCHOLARSHIP

Scholarship requirements are stated on page 56. Candidates for the degree of Bachelor of Science with a concentration in Radiologic Sciences and Administration must complete the first two years of the program with a quality-point index of 2.50 or better in order to begin the final two years of the program.

DEGREE REQUIREMENTS

AREA OF HUMAN COMPETENCE

A minimum of 30 semester hours is required. Specific required courses are BAd 102, 105; Engl 9 or 10, and 11 or 12; Psyc 1; and Soc 124. Recommended electives include Acct 1; C1En 101; Engl 20; Hum 26; Psyc 144, 151; Soc 129. Students specializing in Nuclear Medicine cannot choose C1En 101 or Hum 26 as electives, since these courses are required in their area of vocational competence.

AREA OF SUBJECT COMPETENCE

A minimum of 30 semester hours is required. Specific course requirements are as follows:

In the Diagnostic Radiology Specialization.—Rad 62, 70, 71, 80, 95, 96
In the Nuclear Medicine Specialization.—Rad 65, 66, 75, 81, 82, 93, 94
In the Radiation Therapy Specialization.—Rad 62, 70, 71, 75, 80, 93, 95
In All Three Specializations.—Stat 91; HCS 101
In Subject Electives.—HCS 116; Rad 91

AREA OF VOCATIONAL COMPETENCE

Diagnostic Radiology Specialization

The following courses, a total of 65 semester hours, are required: HCA 203; HCS 125; Rad 40, 41, 42, 50, 51, 60, 61, 90, 97, 99, 140, 144, 145, 167, 168, 171, 175, 190.

Nuclear Medicine Specialization

The following courses, a total of 61 semester hours, are required: C1En 101; HCA 203; Hum 26; Rad 43, 44, 55, 56, 57, 58, 59, 72, 98, 140, 146, 147, 167, 168, 171, 176, 190.

Radiation Therapy Specialization

Students specializing in radiation therapy may enter the program only upon completion of course work in an American Medical Association approved program for radiologic technology and completion of course work at an accredited radiotherapy school, since the School of Medicine and Health Sciences has no Associate in Arts degree program in the field. Completed course work should include clinical experience and training, pathology, principles of radiotherapy, technical radiotherapy, treatment planning, and clinical oncology, for which 21 hours of advanced standing credit will be granted.

In addition to the 21 semester hours of advanced standing, students must complete the following courses, a total of 39 semester hours: C1En 101; HCA 203; HCS 125; Rad 90, 140, 148, 149, 167, 168, 171, 177, 190.

Required or Recommended Courses in Allied Health Programs Offered in Other Divisions of the University

THE FOLLOWING COURSES are offered by Columbian College of Arts and Sciences or the School of Government and Business Administration, and are either required or recommended in specific undergraduate programs in the School of Medicine and Health Sciences. Students are reminded, however, that not all these courses are acceptable even as electives in certain Allied Health Programs. Students should consult with the program adviser in choosing electives for the particular program in which they are enrolled.

ACCOUNTING

1 Introductory Accounting (3)
Basic understanding of accounting concepts, procedures, analyses, and reports; the accounting measurement and communications of significant economic and financial data.

AMERICAN CIVILIZATION

71–72 Introduction to American Civilization (3–3)
Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance.

ANTHROPOLOGY

1–2 Introductory Anthropology (3–3)
Anth 1: survey of man's origin, physical evolution, and culture history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior.

ART

31–32 Survey of Western Art (3–3)
Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art.

71–72 Introduction to the Arts in America (3–3)
Painting, sculpture, and architecture of America, with selected references to crafts and popular arts. Art 71: from colonial beginnings to the Republican Age. Art 72: from 19th century to the present.

BIOLOGICAL SCIENCES

11–12 Introductory Biology for Science Majors (4–4)

Lecture (3 hours), laboratory (3 hours). Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Prerequisite to BiSc 12: BiSc 11. Material fee, $18 a semester.

104 Comparative Vertebrate Anatomy (4)

Lecture (2 hours), laboratory (4 hours). Evolution and comparative morphology of vertebrates, stressing recent forms. Material fee, $20.

111 Introductory Microbiology (4)

Lecture (2 hours), laboratory (4 hours). Survey of the major groups of microorganisms with emphasis on structure, physiology, ecology, phylogenetic relationships, and economic importance. Prerequisite: one year of chemistry. Material fee, $20.

127 Genetics (3)

Introductory course. Basic aspects of transmission of genetic traits with particular reference to the chemical basis of heredity and gene action.

148 Histology (4)

Lecture (2 hours), laboratory (4 hours). Introduction to microscopical anatomy of normal tissues and organs with emphasis on the interrelationship of structure and function. Material fee, $20.

154 Vertebrate Zoology (4)

Lecture and discussion (2 hours), laboratory and field (4 hours). Vertebrate natural history and systematics, emphasizing higher and transitional taxa. Prerequisite: BiSc 104. Material fee, $20.

163 Human Physiology (3)

Introduction to the function of organ systems of the human body.

164 Human Physiology Laboratory (1)

Study of basic physiology laboratory techniques; emphasis on the experimental study of homeostatic mechanisms in humans. Prerequisite or concurrent registration: BiSc 163. Material fee, $24.

165 Vertebrate Physiology (4)

Lecture (3 hours), laboratory (3 hours). Detailed study of selected organ systems, stressing chemical and physical bases. Prerequisite: BiSc 163 and 164, or equivalent. Prerequisite or concurrent registration: Chem 151–52 or 50. Material fee, $24.

BUSINESS ADMINISTRATION

102 Fundamentals of Management (3)

Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking.

105 **Personnel Management** (3)

The labor force and labor markets. Industrial personnel and manpower programs, organization and policy in personnel activities.

CHEMISTRY

11–12 **General Chemistry** (4–4)

Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Elementary course in general chemistry, including qualitative analysis. Prerequisite to Chem 11: one year of high school algebra. Prerequisite to Chem 12: Chem 11. Laboratory fee, $23 a semester.

22 **Introductory Quantitative Analysis** (4)

Lecture (2 hours), laboratory (6 hours). Theory and practice of quantitative analysis by classical methods; introduction to instrumental analysis. Prerequisite: Chem 12. Laboratory fee, $23.

50 **Introduction to Organic Chemistry** (4)

Lecture (3 hours), laboratory (3 hours). A terminal course for students in related disciplines. This course does not fulfill the organic chemistry requirement for chemistry majors or premedical students. Prerequisite: Chem 12 or 16, *Intensive General and Analytical Chemistry* (Honors course). Laboratory fee, $23.

ECONOMICS

1–2 **Principles of Economics** (3–3)

Lecture (2 hours), recitation (1 hour). Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2.

ENGLISH

9 **English Composition: Language as Communication** (3)

Intensive course in English grammar and composition for students inadequately prepared for Engl 10. Begins with detailed instruction, drill, and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 10. Engl 9 meets five hours a week and carries 3 semester hours of credit. Total fee, $320.05 (tuition, $282; additional fee, $25; and University Center fee, $13.05).

10 **English Composition: Language as Communication** (3)

Study and practice of expository techniques: emphasis on the rhetorical complexities of unity, development, organization, and coherence, by analysis of selected current prose; library research procedure.

11 **English Composition: Language and the Arts and Sciences** (3)

Study and practice of expository and argumentative techniques: emphasis on the rhetorical complexities of the sentence and of diction, and on logical thought, by analysis of selected readings on the nature of language

and of the arts and sciences. Prerequisite: Engl 9 or 10. Students who receive credit for Engl 11 cannot receive credit for Engl 12.

12 **English Composition: Language in Literature** (3)

Study and practice of expository and argumentative techniques through critical writing; emphasis on the rhetorical complexities of stylistics in the sentence and in diction, and on logical thought, by the study of literary genres and of the use of language in literature. Prerequisite: Engl 9 or 10. Students who receive credit for Engl 12 cannot receive credit for Engl 11.

20 **The Writing of Reports** (3)

Offered only off campus. Theory and practice in the writing of technical reports. Prerequisite: Engl 9 or 10 and 11.

43–44 **Classical Humanities** (3–3)

Offered only off campus. Interdisciplinary study of the origins of Western thought. Reading and intensive class discussions of selections from the Bible and of five works each semester from the following authors: Homer, Hesiod, Aristophanes, Plato, Aristotle, Aeschylus, Euripides, Sophocles, Herodotus, Thucydides, Lucretius, Marcus Aurelius, Epictetus, Polybius, St. Augustine. Background lectures on the major intellectual, artistic, economic, and social movements. Prerequisite: Engl 9 or 10.

45–46 **Humanities in the Modern World** (3–3)

Offered only off campus. Interdisciplinary study of modern Western thought from the Renaissance to the 20th century. Reading and intensive class discussion of five works each semester from the following authors: Machiavelli, Pope, Voltaire, Rousseau, Goethe, Tolstoy, J.S. Mill, Zola, Nietzsche, Kierkegaard, Freud, Kafka, Koestler, T.S. Eliot. Background lectures on the major intellectual, artistic, economic, and social movements. Prerequisite: Engl 9 or 10.

51–52 **Introduction to English Literature** (3–3)

Representative works by major authors studied in their historical context; discussion of recurrent themes, and introduction to various types and forms of imaginative literature. Prerequisite: Engl 9 or 10.

71–72 **Introduction to American Literature** (3–3)

Historical Survey. Engl 71: from beginnings to the Civil War. Engl 72: from the Civil War to present. Prerequisite: Engl 9 or 10.

91–92 **Introduction to European Literature** (3–3)

Consideration of various types. Prerequisite: Engl 9 or 10.

EXPERIMENTAL HUMANITIES

*26 **Environmental Issues** (3)

An interdisciplinary analysis of selected aspects of the population question, pollution and human health, urban environmental problems, issues of economic growth and development, technology and public policy.

*Offered jointly by the Division of Experimental Programs and the departments of Biological Sciences and Geography and Regional Science.

GEOGRAPHY AND REGIONAL SCIENCE

51 Introduction to Geography (3)

General survey of the systematic fields of human geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts.

52 Introduction to Economic Geography (3)

Examination of the basic principles which determine the location of economic activities on the surface of the earth.

HEALTH CARE ADMINISTRATION

203 Organization and Management of Health Care Institutions (3)
(Formerly Health Care Organization and Management)

Lecture and discussion (2 hours), laboratory (2 hours). History and current character of institutional providers of health care. Function, organizational structure, and interrelationships of various types of health care facilities. Institutional ethics; statistics. Regulation of institutional providers.

HISTORY

39–40 European Civilization in Its World Context (3–3)

Hist 39: political, social, economic, and cultural history to early modern era. Hist 40: from early modern era to present.

71–72 Introduction to American History (3–3)

Hist 71: political, social, economic, and cultural forces of the United States in their world setting from 1492 to 1861. Hist 72: from 1861 to present.

MATHEMATICS

3 College Algebra (3)

Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry.

6 Plane Trigonometry (3)

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor).

9 General Mathematics I (3)

For students electing Math 9 and 10 as a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics.

10 General Mathematics II (3)

Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9.

30 Precalculus (3)

Set theory, inequalities, basic analytic geometry, functions and relations

Polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students must take a placement examination in algebra and trigonometry.

31 Calculus of One Variable (3)

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent.*

51 Mathematics for the Social and Management Sciences I (3)

Notion of function, graph of function; sequences; differential calculus of functions of one variable; exponential and logarithmic functions. New students must take a placement examination in algebra prior to registration.

52 Mathematics for the Social and Management Sciences II (3)

Integral calculus of functions of one variable; functions of several variables; partial derivatives, maxima and minima, Lagrange multipliers; systems of linear equations and inequalities; matrix algebra, determinants, rudiments of linear programming. Prerequisite: Math 51.

MUSIC

3 Introduction to Musical Understanding (3)

Introductory history of musical styles, related to listening; elements and materials of music.

4 Survey of Music Literature (3)

Introductory study of musical forms, structures, and textures; aural analysis of selected literature.

PHILOSOPHY

50 Introduction to Philosophy (3)

Readings from major philosophers and study of philosophic positions from Plato to the present.

POLITICAL SCIENCE

4 Introduction to Political Science (3)

Study of political behavior, including the role of politics in today's world, the sources of elite and mass political behavior, and the influence and nature of political institutions. Students who receive credit for PSc 4 cannot receive credit for PSc 5.

5 Introduction to Political Science (3)

Introduction to the study of comparative political systems; emphasis on structures and processes of major foreign governments and the force of basic ideologies. Students who receive credit for PSc 5 cannot receive credit for PSc 4.

*Math 30 may be waived as a prerequisite by examination on scheduled dates.

6 Introduction to Political Science (3)
Introduction to the study of the structure, powers, and processes of the American political system.

PSYCHOLOGY

1 General Psychology (3)
Fundamental principles underlying human behavior.

8 Psychology of Motivation and Personality (3)
Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, and assessment and description of personality emphasized. Prerequisite: Psyc 1 or equivalent.

22 Introduction to Educational Psychology (3)
The contributions of psychology to education; emphasis on learning. Prerequisite: Psyc 1 or equivalent.

144 Personnel and Industrial Psychology (3)
Psychological concepts and methods applied to problems of personnel management, human engineering, employee motivation, and productivity. Prerequisite: 6 semester hours in psychology.

151 Social Psychology (3)
Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war. Prerequisite: 6 semester hours in psychology.

RELIGION

9 The Hebrew Scriptures (3)
Historical and literary study of the Hebrew Scriptures with consideration of development of religious ideas, institutions, and outstanding personalities.

10 The New Testament (3)
Study of New Testament literature from the standpoint of occasion, purpose, dominant ideas, and permanent values. Emphasis on approach, structure, and significance of the Gospels and Epistles.

59–60 History of Religions (3–3)
Origins, evolution, and contemporary status in historical context. Rel 59: primitive religion and the religions of the East (Hinduism, Buddhism, Taoism, Confucianism, Shinto). Rel 60: religions of the West and Near East (ancient religions, Judaism, Christianity, Islam).

SOCIOLOGY

1 Introductory Sociology (3)
General principles of sociology; development of culture and personality, impact of groups and institutions on man's social behavior.

2 Uses of Sociology (3)

Introduction to the various methods by which sociologists have approached the investigation of social phenomena. Prerequisite: Soc 1.

124 Medical Sociology (3)

Social factors and processes related to the etiology and treatment of physical and mental illnesss; medical occupations and professions, medical organizations, problems of delivery of health care services. Prerequisite: Soc 1.

129 Race and Minority Groups (3)

Analysis of relationships between dominant and minority groups in society, particularly in the United States; nature and range of problems; analysis of the phenomenon of prejudice. Prerequisite: Soc 1.

SPEECH AND DRAMA

111 Business and Professional Speaking (3)

Study of the communication process in business and professional speaking; practice in presenting technical reports; selling policies, programs, and services; interviews; conferences; speech in training and supervisory activities. Primarily for nonmajors.

121 Group Discussion and Conference Leadership (3)

Process of thinking and problem-solving in committees and small groups; methods of leading discussions and conferences. Prerequisite: SPDR 1, *Communicative Speaking and Listening*, or permission of instructor.

STATISTICS

***51 Introduction to Business and Economic Statistics** (3)

Lecture (3 hours), laboratory (1 hour). Frequency distribution, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $18.

***91 Principals of Statistical Methods** (3)

Lecture (3 hours), laboratory (1 hour). Variables and attributes, averages and dispersion, frequency distributions and their characteristics, regression and correlation, statistical decision processes. Laboratory fee, $18.

101–2 Basic Principles of Statistical Methods (3–3)

Offered only off campus. Variables and attributes, averages and dispersion, elementary principles of sampling, introduction to the making of statistical decisions. Prerequisite to Stat 102: Stat 101.

*Stat 51; 53, *Introduction to Statistics in Social Sciences;* and 91 are related in their subject matter, and credit hours for only one of the three may be applied toward a degree.

COURSES OF INSTRUCTION

THE SCHOOL OF MEDICINE AND HEALTH SCIENCES serves other divisions of the University by making available to nonmedical students certain undergraduate and graduate courses in the following departments: Anatomy, Biochemistry, Microbiology, Pathology, Pharmacology, and Physiology. The courses listed are subject to some slight change. The University reserves the right to withdraw any course announced.



STAFF OF INSTRUCTION

The Staff of Instruction listed under each Department is for the academic year 1974–75.

EXPLANATION OF COURSE NUMBERS AND SYMBOLS

A number in parentheses after the name of the course indicates number of semester hours of credit which may be earned.

Courses numbered from 1 to 100 are for first- and second-year undergraduate students. Courses numbered from 101 to 200 are for third- and fourth-year undergraduate students. Courses in the basic science departments numbered from 201 to 400 are for candidates for the M.D. degree and for students in the Graduate School of Arts and Sciences. All other courses numbered from 201 to 400 are primarily for candidates for the M.D. degree.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designations.

Acct	Accounting
AmCv	American Civilization
Anat	Anatomy
Anes	Anesthesiology
Anth	Anthropology
Art	Art
BAd	Business Administration
Bioc	Biochemistry
BiSc	Biological Sciences
CH&D	Child Health and Development
Chem	Chemistry
CIEn	Clinical Engineering
Derm	Dermatology
Econ	Economics
Engl	English
Geog	Geography and Regional Science
HCA	Health Care Administration
HCS	Health Care Sciences
Hist	History
Hum	Experimental Humanities
Idis	Interdisciplinary Courses
M&PA	Medical and Public Affairs
Math	Mathematics
Med	Medicine
Micr	Microbiology
Mus	Music
Neur	Neurology
NSur	Neurological Surgery
Ob&G	Obstetrics and Gynecology
Opth	Ophthalmology
Orth	Orthopaedic Surgery
Otol	Otolaryngology
Path	Pathology
Pchi	Psychiatry and Behavioral Sciences
Phar	Pharmacology
Phil	Philosophy
Phyl	Physiology
Phys	Physics
PSc	Political Science
Psyc	Psychology
Rad	Radiology
Rel	Religion
Soc	Sociology
SPDR	Speech and Drama
Stat	Statistics
Surg	Surgery
Urol	Urology

Anatomy

Chairman: R.S. Snell

Professors C.M. Goss *(Visiting—Medical History)*, F.D. Allan, T.N. Johnson, R.S. Snell

Professorial Lecturers J.L. Angel, T.S. Reese

Associate Professors E.N. Albert, Marilyn Koering

Associate Professorial Lecturers J.A. Di Paolo, Joan Blanchette-Mackie, Kathleen Weston

Assistant Professors Ann Butler, D.E. Morse, M.D. Olson, J.M. Kerns

Assistant Clinical Professor G.P. Bogumill

Adjunct Assistant Professor I.H. Leverton

Special Lecturer Mary Ericksen

Staff

115 **Anatomy for Anesthetists** (3)

For students in the Nurse Anesthetist Program. Offered off campus through the College of General Studies. Anatomical facts and concepts essential for safe administration of anesthetics; emphasis on anatomy of head and neck.

Staff

*201 **Anatomy**

All anatomical disciplines are integrated: regional gross dissection, histology, neuroanatomy, embryology. (Fall)

Snell and Staff

202 **Gross Anatomy** (6)

For graduate students. Regional dissections of adult cadaver supplemented with lectures and X-rays. Laboratory fee, $30. (Fall)

Allan

203 **Human Embryology** (1)

For graduate students. Origin and development of human body; emphasis on value of embryology in interpreting anatomical anomalies. (Fall)

Johnson, Butler

204 **Neuroanatomy** (2)

For graduate students. Gross and microscopic anatomy of central nervous system and special senses. Students who have received credit for Anat 204 may not register for Anat 212. Laboratory fee, $13. (Fall)

Albert and Staff

205 **Human Microscopic Anatomy** (3)

For graduate students. Microscopic structure of cells, tissues, and organs of the human body. Laboratory fee, $20. (Fall)

Albert

206 **Electron Microscopic Histochemistry** (3)

For graduate students. Experimental study of electron histochemical techniques. Prerequisite: Anat 205 or equivalent. Laboratory fee, $30. (Spring)

* Required for medical students.

208 **Comparative Vertebrate Neurology** (1) Butler, Johnson

For graduate students. Survey of the evolution of the vertebrate brain. Prerequisite: Anat 204. Laboratory fee, $10. (Spring)

209 **The Use of Audio-visual Techniques in Anatomy** (2) Allan

For graduate students. Preparation of a significant audio-visual program of some aspect of human anatomy. Laboratory fee, $20. (Spring)

210 **The Use of Computers in Anatomy** (2) Snell

For graduate students. Applying computer techniques to the problems of learning anatomy. Limited enrollment. Laboratory fee, $20. (Spring)

211 **Cell Biology** (2) Staff

For graduate students. Same as Idis 211 and Phyl 211. An integrated survey of the structure, function, and metabolism of the cell, as an introduction to the medical sciences.

212 **Neurobiology** (3) Staff

For graduate students. Same as Idis 212 and Phyl 212. An integrated survey of the structure and function of the human nervous system; lecture, clinical demonstration, and laboratory. Laboratory fee, $25.

221–22 **Seminar** (1–1) Koering

For graduate students. Research reports and discussions of special topics by staff and graduate students. Medical students encouraged to attend. (Academic year)

249 **Introduction to Anatomical Research** (1) Staff

For graduate students. Major research techniques as applied to biological materials in the various anatomical disciplines. (Fall)

252 **Physical Anthropology** (1) Angel

Variations in man and factors affecting him, human evolution and racial differences, anatomy and culture of ancient man. (Spring)

254 **Fetal Anatomy** (2) Allan

Dissection of early and late human fetus. Comparison of fetal and adult structures. 20 students. Laboratory fee for nonmedical students, $10. (Spring)

256 **Human Genetics** (1) C.B. Jacobson

General principles of genetics, new cytogenetics techniques, aneuploidy in man and its significance, biochemical aspects of heredity, genetic counseling. (Spring)

258 **Cytology** (3) Albert and Staff

Detailed study of morphology and function of the cell and its organelles. Basic cytological techniques emphasized. Laboratory fee for nonmedical students, $20. (Spring)

260 **Electron Microscopy in Cellular Biology—Lecture** (1) Koering

Introduction to the morphology of the cell and its components. (Spring)

261 **Electron Microscopy in Cellular Biology—Laboratory** (2) Koering

Introduction to the routine processing of specimens; preparation and inter-

pretation of micrographs. Limited enrollment. Admission by permission of instructor. Prerequisite or concurrent registration: Anat 260. Laboratory fee for nonmedical students, $15. (Spring)

262 **Gross Anatomy of Upper and Lower Extremities** (2) Snell and Staff
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee for nonmedical students, $10. (Spring)

263 **Applied Anatomy of the Autonomic System** Allan
Comprehensive study of the structure and function of the autonomic nervous system. 4-week elective periods.

264 **Gross Anatomy of Head and Neck** (2) Snell
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee for nonmedical students, $10. (Spring)

266 **Gross Anatomy of Thorax and Abdomen** (2) Snell
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee for nonmedical students, $10. (Spring)

268 **Gross Anatomy of Pelvis, Perineum, and Lower Extremity** (2) Snell and Staff
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee for nonmedical students, $10. (Spring)

270 **Dissection of the Human Brain** (1) Johnson
Dissection of major pathways and nuclei of the brain with consideration of ventricular system; conferences and assigned reading. Limited enrollment. Laboratory fee for nonmedical students, $10. (Spring)

272 **Autonomic Nervous System** (1) Allan
Development, microscopic and gross anatomy, function of central and peripheral components of autonomic nervous system. (Spring)

276 **Advanced Studies in Anatomy** (1) Staff
Lectures and conferences on selected anatomical subspecialties—endocrinology, teratology, growth, etc. May be repeated for credit. (Spring)

279 **Applied Regional Anatomy** Snell
Regional dissection, guided readings, weekly discussions. 4-week elective periods.

281 **Applied Anatomy of the Newborn** Allan, Snell
The full-term fetus or neonatal infant examined by dissection or by study of pre-dissected specimens. 4-week elective periods.

282 **Advanced Neuroanatomy** Johnson, Butler
Dissection of the human brain, study of slides of the central nervous system, and an introduction to neurological research. 4-week elective periods.

284 **Applied Surface Anatomy and Radiology** Snell
Detailed study of anatomical structures which are accessible to examina-

tion in the living subject; normal radiology of the body. 4-week elective periods.

285 **Application of Audio-visual Techniques to Anatomy** Allan

Students identify, develop, and produce an audio-visual program on some aspect of human anatomy. 4-week elective periods.

287 **Human Cytogenetics** C.B. Jacobson

Chromosomal research on reproductive anomalies, congenital malformations, mutagenic assay. Tissue culture, photomicrography, karyotypic analysis, genetic counseling. 8-week elective periods. Univ. Hosp.

288 **Surface Anatomy and Radiology** (1) Snell

Lectures and demonstrations on areas of clinical importance.

289 **Application of Computer Techniques to Anatomy** Snell

A simple anatomical program devised to demonstrate the application of computer techniques to problems of learning anatomy. 4-week elective periods.

291 **Special Projects in Anatomy** Snell

Independent study on any aspect of gross anatomy worked out between the student and the instructor. 4-week elective periods.

292 **Advanced Reproductive Endocrinology** Koering

Study of structure and function of male and female reproductive organs; emphasis on correlating their activities with those of other endocrine glands. 4-week elective periods.

295 **Research** (arr.) Staff

Content differs each time course is offered; may be repeated once for credit. Fee to be arranged. (Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Anesthesiology

Chairman: C.S. Coakley

Professors C.S. Coakley, Seymour Alpert, B.S. Epstein, Paul Mazel, R.J. Van Houten, Herbert Weintraub

Associate Professors W.L. Marsh, Paula Kaiser, Marie-Louise Kennedy, G.A. Morales, R.E. Tobey, B.S. Dunbar, J.B. Craft, Jr.

Associate Clinical Professor S.N. Albert

Assistant Professors M.J. Shaffer, J.E. Zimmerman, Alice Altstatt, K.J. Hassan, J.P. Swope, Maya Karna, Mohammad Shahvari, Lilia Banzon, M.F. Gonzales, D.S. Lee, V.A. Argumedo, S.R. Deshmukh, M.H. Thein, Danna Peterson, J.A. Tam
Assistant Clinical Professors W.E. Bageant, Chalom Albert, Philip Lowenthal, M.W. Lichtmann, M.H. Rosenthal, Hildegard Manitsas
Clinical Instructor Nan-Huan Char

Courses numbered 190 through 194 are for students in Nurse Anesthetist undergraduate programs.

Staff

190 **Seminar: Anesthesiology** (4)
Small discussion groups with the teaching staff of the Department on morbidity and mortality from actual and/or reported cases. Topics related to complications of anesthesia.

Staff

191 **Respiratory Care** (3)
Advanced techniques for the care of patients requiring total prolonged respiratory support.

Staff

192 **Orientation for Anesthesia** (3)
Lecture, group discussion, and audio-visual presentation. Topics covered include history of anesthesia, legal aspects, ethics, psychology, professional adjustments, department management, and organization.

Staff

193 **Methods and Procedures in Anesthesia** (3)
Lecture, group discussion, and audio-visual presentation. Topics covered include anesthesia techniques, positions in anesthesia, types of anesthetic required to meet the needs of different surgical specialties, and related topics.

Staff

194 **Principles of Clinical Anesthesia** (3)
At affiliated hospitals. Programmed supervised clinical training and experience. The student is assigned patients, organizes and administers anesthesia, and follows the patients through their total hospitalization. Designed to satisfy the American Association of Nurse Anesthetists requirements. Course is repeated for credit for 3 semesters, for a total of 9 semester hours.

Staff

*302 **Clinical Clerkship**
Clinical preoperative evaluation, surgical and obstetrical anesthesia, infant and adult resuscitation, inhalation therapy, management of patients in coma, shock, and other problems which may be encountered in medical practice. 1 week—Univ. Hosp., 1 week—Nat'l. Naval Med. Center or Walter Reed Gen. Hosp. (2-week periods throughout academic year)

Weintraub

380 **Anesthesiology**
Clinical experience in preoperative evaluation, surgical and obstetrical anesthesia, infant and adult resuscitation, inhalation therapy; monitoring and blood gas determinations. 4-week elective periods. Univ. Hosp.

384 **Intensive Care Unit** Klingenmaier, Shahvari, Zimmerman
Evaluation and management of respiratory failure, rationale and use of

* Required for medical students. Part of Med 308. Credit assigned after completion of Med 308.

automatic ventilators, chronic airway management, cardiovascular support, and intensive care. 4-week elective periods. Univ. Hosp.

386 **Intensive Care Unit** Rosenthal

Evaluation and management of respiratory failure, rationale and use of automatic ventilators, airway management, cardiovascular support techniques, and intensive care medicine. 4-week elective periods. Nat'l. Naval Med. Center

390 **Extramural Anesthesiology Elective** (arr.)

The Department arranges for students to spend elective periods at other institutions. Interested students should contact Dr. Herbert Weintraub.

Biochemistry

Chairman: C.R. Treadwell

Professors C.R. Treadwell, B.W. Smith, G.V. Vahouny, J.M. Bailey, Helen Hess
Professorial Lecturers W.W. Burr, Jr. *(Isotopes)*, Edward Steers, Jr., Gordon Guroff, A.N. Schechter, Elizabeth Anderson, C.R. Merril
Associate Professors G.A. Walker, L.D. Faller *(Visiting)*
Assistant Professor Linda Gallo *(Research)*
Assistant Professorial Lecturer C.L. Trichilo
Lecturer P.H. Fishman
Special Lecturer J.C. Smith, Jr.

*201 **Medical Biochemistry** Staff

Lectures and laboratory; emphasis on basic principles and their relation to medicine. (Fall)

221–22 **General Biochemistry** (3 or 4–4 or 5) Vahouny, Gallo, and Staff

A comprehensive course in general biochemistry for graduate students in biomedical sciences and undergraduate students in biology and chemistry. Graduate students *must* register for Bioc 221, 4 semester hours; Bioc 222, 5 semester hours. With specific recommendation by the undergraduate adviser and the Department, undergraduate students may register for Bioc 221, 3 semester hours; Bioc 222, 4 semester hours. Prerequisite: Chem 152, 154. Material fee (graduate students only), $20 a semester. (Academic year)

224 **Biochemistry of Enzymes** (1) E. Anderson

Biochemistry of enzymes and enzyme reactions. Prerequisite: Bioc 201 or 221. (Fall)

225 **Biochemistry Procedures** (3) B. Smith and Staff

Laboratory course. Material fee for nonmedical students, $16. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

*Required for medical students.

Bailey

227 **Biochemistry Seminar** (1)

Current literature in biochemistry, mainly for graduate students, but open to limited number of specially qualified medical students. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

Steers

232 **Proteins and Amino Acids I** (1)

Prerequisite: Bioc 201 or 221. (Fall)

Steers, Schechter

233 **Proteins and Amino Acids II** (1)

Continuation of Bioc 232. Methods for the study of protein confirmation; determination of active sites of enzymes; mechanisms of reactions at the active site. (Spring)

Burr

241 **Isotopes** (3)

Theoretical characterization of isotopes and their applications in biology and medicine. Attention given to counting, health physics and radiation safety, autoradiography, chromatography. Laboratory fee for nonmedical students, $16. (Spring)

251 **Carbohydrate Metabolism** (1)

Prerequisite: Bioc 201 or 222. (Spring 1976 and alternate springs)

Malone

252 **Biochemistry of the Brain** (1)

For medical students; open to limited number of graduate students. Recent biochemical developments in structure, functions, and metabolic processes unique to the brain. (Spring)

254 **Human Nutrition** (1)

For medical students; open to limited number of graduate students. Application of nutritional principles in humans. (Spring)

N. Kramer

256 **Biochemistry of Organ Function** (1)

For medical students; open to limited number of graduate students. Emphasis on biochemical processes unique to particular organ systems; application of these processes to evaluation of function. (Spring)

O. Dodek

260 **Biochemistry of the Steroids** (1)

For medical students; open to limited number of graduate students. Basic chemistry of the steroids, pathways of biosynthesis and metabolism, regulatory mechanisms, physiologic effects, clinical measurement of endogenous steroids, clinical manifestations of steroid imbalance, steroid changes in pregnancy, and steroid therapy. (Spring)

Vahouny

262 **Biochemistry of the Lipids** (1)

Discussion of topics of current interest, including digestion, energy production, biosynthesis, function in specialized tissues and subcellular particles. Content differs each time course is offered; may be repeated for credit. (Spring)

W. Anderson

266 **Biochemical Genetics and Inherited Metabolic Diseases** (1)

For medical students; open to limited number of graduate students. Biochemical aspects of genetics and contributions of molecular biology to understanding of human mutations and hereditary diseases. (Spring

268 **Biochemistry of Bone and Muscle** (1) — Walker

Study of structure, chemistry, and biochemistry as they relate to the normal and diseased states of bone and muscle; emphasis on current theories and techniques. (Spring)

279 **Research in Renal Function, Mutarotase, and Sugar Transport** — Bailey

Clinical significance of plasma mutarotase levels in kidney disease. 8-week elective periods.

280 **Research in Experimental Atherosclerosis** — Bailey

Study of factors influencing the development and course of atherosclerosis in rabbits. 8-week elective periods.

281 **Research in Biochemistry of Carbohydrates and Enzymes** — B. Smith

Research in a problem already under investigation in the Department or a project in related fields suggested by the student. 8-week elective periods.

282 **Research in Biochemistry of Lipid Metabolism and Transport** — Vahouny

Biochemical investigation of a clinical problem involving lipids of special interest to the student, or participation in existing research program in the Department. 8-week elective periods.

283 **Research in Metabolic Regulation within the Heart** — Vahouny

Studies on metabolic regulation and effects of drugs. 8-week elective periods.

286 **Research in Biochemistry and Molecular Biology of RNA Tumor Viruses or DNA Polymerases of Mammalian Cells** — R.C. Gallo*

(Formerly Research on Transfer RNA and Protein Biosynthesis in Normal and Tumor Cells)

Investigative work at the National Cancer Institute, NIH. 8-week elective periods or equivalent.

287 **Research on the Function of B_{12} Coenzymes in Cell Replication** — Walker

Research in a problem under investigation in the Department. 8-week elective periods.

288 **LDH Viruses in Immunosuppression** — Bailey

Changes in plasma enzyme clearance and cellular immune mechanisms in LDH virus infection. 8-week elective periods.

290 **Extramural Biochemistry Elective** (arr.) — Staff

The Department arranges for medical students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

*Dr. Gallo is Senior Investigator at the National Cancer Institute.

295 **Research in Biochemistry** (arr.) Staff

For 1st- and 2nd-year medical students and for graduate students. Participation in a project under investigation in the Department or one in a related field suggested by the student and approved by the Staff. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Child Health and Development

Chairman: R.H. Parrott

Associate Chairmen: F.C. Green *(Child Health Advocacy)*, D.W. Delaney *(House Staff and Medical Care)*, J.C. Houck *(Research)*, A.M. Margileth *(Student Affairs)*, J.G. Randolph *(Surgical Division)*

Directors of Divisions: B.S. Epstein *(Anesthesiology)*, F.C. Green *(Child Health Advocacy)*, Gordon Avery *(Neonatology)*, M.J. Malone *(Neurology and Neurosurgery)*, M.M. Parks *(Ophthalmology)*, D.W. McKay *(Orthopaedics)*, B.M. Webb *(Otolaryngology)*, D.W. Delaney *(Pediatric Medicine)*, Gloria Eng *(Physical Medicine and Rehabilitation)*, W.J. McSweeney *(Radiology)*, J.G. Randolph *(Surgery)*, D.S. Friendly *(Ophthalmology)*, Irvin Feldman *(Otolaryngology)*

Professors R.S. Higdon, J.P. Adams, J.G. Randolph, R.H. Parrott, Spyros Doxiadis *(Visiting)*, S.L. Leikin, J.C. Houck *(Biochemistry)*, A.M. Margileth, M.J. Malone, B.S. Epstein, Gordon Avery, D.W. Delaney, Wellington Hung, L.P. Scott III, R.M. Chanock, D.W. McKay, J.E. McClenathan, W.J. McSweeney, F.C. Green, Rebecca Reiger *(Research)*, Mervyn Elgart, T.H. Milhorat

Clinical Professors L.E. Hoeck, W.A. Howard, Sidney Berman, Sydney Ross, William Stark, M.M. Parks, J.D. Noshpitz, Morris Feitel, Leon Cytryn, Jeanne Spurlock, S.L. Baker, Jr.

Professorial Lecturer Melvin Jenkins

Associate Professors Margaret Gutelius, L.W. Perry, H.B. Richardson, Jr., Gloria Eng, Ann Barnet, Massoud Majd, Nasser Movassaghi, D.W. Bailey, M.N. Ozer *(Research)*, J.R. Puig, Constance Battle, J.C.M. Chan, D.J. Fishman, C.A. Rigg, G.P. August, C.D. Brandt *(Microbiology)*, R.P. Altman, H.W. Kim, D.S. Friendly, B.S. Dunbar, Anne Fletcher, D.L. Breckbill, L.W. Thompson

Associate Clinical Professors J.J. McFarland, Jr., S.I. Wolf, A.B. Coleman, Bennett Olshaker, Belinda Straight, G.J. Cohen, J.J. Francis, A.F. North, Jr.

Iradj Mahdavi, Isabella Bourne, A.J. Modlin, P.C. Brunschwyler, Max Fischer, P.F. Wohlford, H.T. Yates, B.H. Ong, H.R. Gold, J.L. Chamberlain III, Karin Nelson, Carolyn Robinowitz

Assistant Professors Jane Todaro, Jocelyn Hicks, M.M. Platt, J.H. Wise, K.J. Hassan, H.A. Mangold, W.S. McCurley, Beneta Peacock, D.A. Davis *(Research)*, Annette Ficker, S.R. Shapiro, Elaine Esber, R.A. Cahill, R.E. Johnsonbaugh, L.W. Greenberg, Maya Karna, Kathryn Anderson, Lilia Banzon, J.C. Srabstein, P.A. Moskovitz, S.S. Nason, B.M. Potter, Kent Ravenscroft, Jr., V.A. Argumedo, G.W. Bailey, F.M. Midgley, M.H. Thein, J.A. Tam

Assistant Clinical Professors J.L. Levine, I.D. Milowe, H.G. Clark, Stephen Mourat, Erwin Friedman, M.S. Glatt, A.E. Marans, Elma Denham, D.H. McKnew, Jr., L.A. Cove, Milton Engel, Mary Fox, V.L. Guandolo, Leonard Lefkowitz, J.G. Chopra, S.G. Werner, A.B. Zients, G.W. Hardman, Jr., G.A. Balfour, D.G. Albert, B.M. Webb, Virginia Ingram, G.W. Mella, G.A. Tripp, Michael Brody, J.L. Hatleberg, K.L. Kaplan, Robert Shearin, F.A. Pedreira, Thomas Sullivan, Lovisa Tatnall, Edith Taylor, Stanley Greenspan, Richard Evans III, Sylvia Wooten, Christina Kimball, Jocelyn Malkin, D.M. Cathro, D.R. Meers, B.A. Shaver, Marilyn Renfield, Barry Landau, A.H. Stein, P.T. Peebles, Miryam Davis, R.A. Nover, H.T. Yates, Jr., Mary Fox, F.K. Johnson, David Goldsmith, P.M. Farrell *(Research)*, W.H. Browning

Assistant Professorial Lecturer I.P. Weiss

Instructors Ramesh Desai *(Research)*, Maureen Edwards, M.D. Smokvina, Judith Fallon, A.M. Attallah *(Research)*, Mary Beale, Rosella Castro, Kanagaratnam Kanagalingam *(Research)*

Clinical Instructors H.H. Diamond, Emilie Black, Hilary Millar *(Psychiatry)*, Harold Plotsky, D.A. Young, George Joseph, M.L. Feldman, Manouchehr Rokni, H.J. Steinfeld, B.S. Bruner, M.E. Lederman, M.E. Bravo, G.W. Daisley, Jr., K.G. Kassebaum, Agnes Schweitzer, Sirus Amiri, Viola Cheng, Vichitur Chusuei, Thomas Frey, M.J. Guralnick *(Psychology)*, Annop Tantisunthorn, J.M. Burgin, R.H. Schwartz, Cecilin Chisholm, Mario Ortega, M.W. Dutch, F.L. Stroud, H.S. Williams, Lillian Beard, T.M. Connor, S.C. Goyal, H.L. Kaftarian, R.P. Dickey, J.A. Lowe, F.J. Crosson, Jr., R.R. Cioletti, A.R. Ugel, M.G. Walten, Jr., Carol Schulman, Maryanne Bayley, C.B. Feinstein, Mary Murphy

Special Lecturers J.A. Bottiglione, C.J. Schulte III, J.W. Oberman, E.V. Soto, R.F. Hinckley, Susan Fisher, C.M. Berlin, Jr., M.I. Mones, R.S. Chandra, Lucas Kulczycki, Marianne Schuelein, J.A. Kenney, Jr., M.I. Michael, B.J. Walsh, J.L. Sever, Paul Hamosh, Ira Seiler, J.M. English III, J.H. Bayly, B.W. Janicki

*303 **Pediatric Clerkship** — Margileth

Full-time, as part of resident team; ward rounds; work in outpatient department and specialty clinics under staff supervision; child psychiatry and child guidance, lectures, clinical conferences, grand rounds. Children's Hosp. (Annual, continuous 8-week rotation)

374 **Mental Retardation** — Cytryn

Diagnostic work-up of mentally retarded children and adolescents. Conferences, community resources. 4- or 8-week elective periods.

* Required for medical students.

376 **Pediatric Neurology** — Malone, Platt, Fishman

Participation in diagnostic and therapeutic studies on inpatients and outpatients. Rounds, conferences, seminars. 4- or 8-week elective periods. Children's Hosp.

377 **Community Health Development** — Hinckley

Acquaintance with public health preventive and community medicine as it is conducted by the Montgomery County, Md., Health Department. Opportunity to work in outlying health center satellites and central pediatric specialty clinics and to become familiar with school health programs and projects. 4- or 8-week elective periods.

378 **Nutrition** — Todaro

Therapeutic nutrition and nutritional content of foods taught in a variety of clinical circumstances. Rounds and tutorials with chief dietitian; well and sick baby clinic, adolescent clinic, and newborn nursery. 4-week elective periods. Children's Hosp.

380 **Clinical Pediatrics** — Margileth, Puig

Full-time, as part of resident team; wards, outpatient department, and specialty and emergency clinics under staff supervision. Participation in diagnostic studies, therapeutic procedures, rounds, and conferences. Acting internships are available. 4-week elective periods. Children's Hosp.

381 **Pediatric Allergy** — Howard

Introduction to pediatric allergy, clinics and wards, some experience in experimental techniques and preparation of extracts. 4- or 8-week elective periods. Children's Hosp.

382 **Pediatric Radiology** — McSweeney

Diagnostic and therapeutic radiology in infants and children; special diagnostic procedures. 4-week elective periods. Children's Hosp.

383 **Cystic Fibrosis** — Kulczycki

Detailed diagnostic and therapeutic procedures including pulmonary and nutritional manifestations and complications as seen in cystic fibrosis patients, from the newborn to those in their third decade. Medical, surgical, psychological, and social problems of cystic fibrosis patients and their families. 4-week elective periods. Children's Hosp.

384 **Newborn and Premature** — Srabstein

Principles and practices of neonatology emphasizing basic physiological processing; their relationship to normal development and to diseases in the newborn period. 4-week elective periods. Univ. Hosp.

385 **Child Psychiatry** — Webster

Observation of and appropriate participation in diagnostic, consultative, and follow-up work with hospitalized children and psychiatric outpatients. Clinical and theoretical conferences. Orientation to community child psychiatry and child mental health as part of service delivery system. 4-week elective periods.

386 **Pediatric Hematology** — Leikin

Clinical and laboratory studies of infants and children with hematologic disorders; bone marrow examinations. 4-week elective periods. Children's Hosp.

387 **Clinical Pediatrics** — Soto

Care of newborn and children on inpatient basis; diagnostic studies, therapy; assigned reading. 4-week elective periods. Fairfax Hosp.

388 **Newborn Medicine** — Avery, Fletcher

Observation and participation in the care of infants. 4-week elective periods. Children's Hosp.

389 **Pediatric Cardiology** — L. Scott, Perry

Physical diagnosis of congenital and acquired heart diseases, interpretation of electrocardiograms and vectorcardiograms, cardiac catheterizations. 4-week elective periods. Children's Hosp.

390 **Extramural Pediatric Elective** (arr.)

The Department arranges for students to spend elective periods at other institutions. Interested students should contact Dr. Andrew Margileth.

391 **Cell Biology Research** — Houck

Biochemical studies of normal and diseased human cells in culture. 4- or 8-week elective periods. Children's Hosp.

392 **Adolescent Medicine Clerkship** — Rigg

Study of the normal developmental problems of adolescence. Experience in the medical care of adolescents with consultative and teaching conferences. 4- or 8-week elective periods. Children's Hosp.

393 **Pediatric Anatomical Pathology and/or Clinical Pathology** — Hicks, Chandra

Participation in necropsy and surgical pathology service. Clinical correlation of histopathology, laboratory studies, and clinical disease. 4-week elective periods. Children's Hosp.

394 **Pediatric Clinical Laboratory** — Hicks, Margileth

Laboratory studies of infants and children correlated with clinical disease. In-depth review of laboratory diagnostic studies. 4-week elective periods. Children's Hosp.

395 **Endocrinology** — Hung, August

Evaluation of patients with metabolic and endocrine disorders. Planning of diagnostic and therapeutic programs of patients in an office setting and possibly inpatients. 4-week elective periods. Children's Hosp.

396 **The Handicapped Child and Chronic Disease** — Battle

An approach to the care of the handicapped child, in a clinical situation and through tutorial readings. 4-week elective periods. Hosp. for Sick Children.

397 **Nephrology** — Chan

Training in clinical nephrology and hemodialysis; research opportunities in Vitamin D metabolism, acid-base physiology, intravenous nutrition, renal physiology, and calcium metabolism. 4-week elective periods. Children's Hosp.

398 **Comprehensive Care** — Oberman

Participating in both sick- and well-child care as administered in a comprehensive setting; experience in multidisciplinary approach; cooperative plan-

ning with other community agencies. 4- or 8-week elective periods. Comprehensive Health Care Program.

399 **Community Pediatrics** Greenberg

For students primarily interested in the private practice of pediatrics. Care in the nursery and pediatric ward of a community hospital; exposure to private practice of pediatrics in an office setting. 4-week elective periods. Holy Cross Hosp.

Clinical Engineering

Chairman: W.S. Yamamoto

Professors W.S. Yamamoto, H.V. Pipberger
Adjunct Professors C.E. Huckaba, Jean Weston
Professorial Lecturer Bernard Kemp
Associate Professorial Lecturer G.B. Devey
Assistant Professors Alan Berson *(Research)*, Rosalie Dunn *(Research)*, Hanna Pipberger *(Research)*, U.E. Ruttiman, F.H. Orthner
Assistant Clinical Professors H.A. Haessler, P.R. Moyer
Instructor Ramez Bassir

101 **Practical Computing for Paramedics** (3) Staff

For students in the Radiologic Science and Administration degree program. Designed to familiarize the student with a computer system.

351 **Clinical Engineering for Medical Students** Staff

Students will be assigned for tutorial instruction in the principles and practices of clinical engineering. Participation in current laboratory projects, assigned reading and study. Participation in the Health Care Technology Seminar is required during the period of the elective. Students should have some basic knowledge of mathematics or physics, or some prior exposure to engineering disciplines. Consultation with the staff is required prior to enrollment. 4-week elective periods. Warwick Bldg.

353 **Medical Computing** Staff

Aspects of computer usage including the preparation and execution of programs which involve clinical or research applications, such as ECG analysis, pulmonary function calculation, medical file management, mathematical modeling, data processing, and managerial computing. In some cases, the staff may be able to supervise a student in an area of his choice; in general, however, the program will consist of formal classroom instruction as well as individual study. Participation in the Health Care Technology Seminar is required during the period of the elective. 4- or 8-week elective periods (may be taken in two divided 4-week periods). Warwick Bldg.

354 **Automated Medical Measurement Systems** Staff

Under supervision, the student will work in the daily operation of a multiphasic screening clinic and participate in the process of new implementations and in evaluation of the system. Review of variability of clinical findings and the problems of the variability of clinical observation. Partici-

pation in the Health Care Technology Seminar is required during the period of the elective. 4-week elective periods. Warwick Bldg.

390 **Extramural Clinical Engineering Elective** Staff

The Department will sponsor students to spend one or more elective periods at other institutions. Interested students must have the approval of the Chairman of the Department.

Dermatology

Chairman: R.S. Higdon

Professors R.S. Higdon, Mervyn Elgart
Associate Clinical Professors W.M. Narva, O.G. Rodman
Assistant Clinical Professors C.S. Brown, Manuel Landman, P.L. Repetto, Jr., Donald Mitchell, L.J. Eanet, Maria Turner, T.P. Nigra
Clinical Instructors H.S. Golomb, R.N. DeAngelis, D.L. Pierson, D.N. Robins, A.R. Ugel
Special Lecturers Naomi Kanof, J.A. Kenney, Jr., Zenona Mally

380 **Dermatology Clinic** Higdon

Conferences, lectures, and attendance at dermatology clinic where patients with wide variety of dermatoses are seen. Diagnosis and treatment of common skin disorders. Dermatologic surgical procedures, technique for using liquid nitrogen, culture and identification of fungi, microscopic diagnosis of common cutaneous diseases. 4-week elective periods. Univ. Ambulatory Care Ctr.

381 **Dermatology Clinic** Mitchell

Same as Derm 380. 4-week elective periods. Group Health Asso., Inc.

382 **Dermatology Clinic** Rodman

Same as Derm 380. 4-week elective periods. Walter Reed Gen. Hosp.

383 **Dermatology Clinic**

Same as Derm 380. 4-week elective periods. Andrews Air Force Base Hosp.

384 **Private Office Practice** Repetto

4-week elective periods.

385 **Private Office Practice** Eanet

4-week elective periods.

387 **Clinical Dermatology** Fischman*

Introduction to clinical dermatology. Working in the out-patient dermatology clinic, observing in-patient consultations, reviewing histopathology, performing skin biopsies. Close supervision by staff. Interview required. 4-week elective periods. VA Hosp.

*Dr. Fischman is Chief of the Dermatology Service at the Veterans Administration Hospital.

388 **Dermatology in General Medicine** Nigra

Dermatology as related to internal medicine. Mechanisms of diseases; in-depth approach to dermatologic-medical problems; advanced reading. 4-week elective periods. Wash. Hosp. Center.

390 **Extramural Dermatology Elective** (arr.)

The Department arranges for students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

Health Care Sciences

Acting Chairman: T.E. Piemme

Professors T.E. Piemme, F.C. Green
Clinical Professor P.J. Sanazaro
Associate Professors Michael McCally, Robert Keimowitz, John LaRosa, Stanley Marinoff, S.A. Schroeder
Associate Clinical Professor Peter Birk
Assistant Professors Jean Vazuka, J.M. Wise, Mary Silverman, J.B. Crandall, B.B. Doyle, E.W. Sutherland III, P.J. Steinglass, K.E. Joslyn, G.W. Bailey, Lawrence Sank, M.A. Newman,
Instructors Judith Fallon, B.A. Cassidy, K.R. Sorem, W.A. Stein, K.R. Katterjohn
Clinical Instructors N.T. Connolly, Mark Greene, Valery Miller, R.A. Berenson, W.D. Lassek, J.A. Sandler, J.M. McGinnis, M.J. Fliegelman, M.F. Mullarkey, S.P. Staal, E.B. Borroum, V.V. Kalbian

Courses numbered from 10 through 96 are limited to military personnel in the Medical Service Technology Program.

10 **Anatomy and Physiology** (2) Staff
(Formerly Epid 10)

Study of the human body: esteology, arthrology, myology, hematology, immunology; circulatory, respiratory, digestive, endocrine, excretory, nervous, and reproductive systems.

11 **Applied Anatomy and Physiology** (6) Staff
(Formerly Epid 11)

Application of anatomical and physiological principles. Control of hemorrhage, methods of resuscitation, management of shock, relief of pain; physical examination, nutrition, fluid and electrolyte balance, respiratory conditions, childbirth.

15 **Pharmacology and Toxicology** (5) Staff
(Formerly Epid 15)

Study of medicinal substances used in the treatment of man: pharmaceutical mathematics, terminology, preparations, compounding, physiological action and potential toxic reactions of certain drugs, legal aspects of drug regulations.

16 **Clinical Laboratory Techniques and Procedures** (2) **Staff**
(Formerly Epid 16)
Study of certain laboratory procedures used in basic health maintenance. Use of microscope, complete blood count, acid-fast stain, urinalysis, blood sedimentation rate, RPR card test, coagulation and bleeding time, blood grouping, blood typing.

22 **Introduction to Epidemiology** (2) **Staff**
(Formerly Epid 22)
Study of common communicable diseases, immunologic factors and procedures. Contact interviewing and reporting of the communicable diseases.

67 **Disaster Sanitation** (2) **Staff**
(Formerly Epid 67)
Survey of nuclear, biological, and chemical hazards; emphasis on detection, personnel protection, and related functions.

68 **Environmental Sanitation** (3) **Staff**
(Formerly Epid 68)
Study of certain environmental factors which contribute to human health. Food, water, living and working spaces, economics, and pest control.

92 **Medical Material Management** (5) **Staff**
(Formerly Epid 92)
Study of the management of material in the medical facility. Budget and budgeting process, expense operating budget, purchasing, material receipt and inspection, inventory of equipment and supplies, controlled medicinals, stock record cards, surveys and adjustments, classes of plant property, property accountability, storage requirements.

93 **Health Systems Administration I** (4) **Staff**
(Formerly Epid 93)
Study of health systems organization. General office procedures, basic typing methods, standard subject identification codes, filing procedures, records disposal, security of patient information, correspondence, procedural manuals.

94 **Health Systems Administration II** (4) **Staff**
(Formerly Epid 94)
Study of planning procedures in a health system. Planning of office systems and procedures, office environment and location planning, office quality control, work measurement methods, authority and organizational relationships, principles of office organization, employee supervision.

95 **Records Management** (6) **Staff**
(Formerly Epid 95)
Study of public health records management. Classification of personnel, personnel records, promotions, educational services, career development, personnel orientation, medical care eligibility, patient data systems, statistical analysis.

96 **Clinical Experience: Medical Service Technology** (6) **Staff**
(Formerly Epid 96)
Supervised experience and research involving the application of principles learned in didactic experience to the practical situation.

Courses numbered 101 through 199 are for students in the allied health programs.

101 **Normal Structure and Function of Man** (9) Staff
Lecture, film, and demonstration. The normal structure and function of man as an integration of anatomy, chemistry, and physiology, comprising the major systems of the human body: (1) cellular, (2) musculoskeletal, (3) nervous, (4) endocrine, (5) cardiovascular, (6) respiratory, (7) gastrointestinal, (8) urinary, (9) reproductive, and (10) integrated. (Fall)

*102 **Environmental Sanitary Science I** (2) Staff
(Formerly Epid 101)
Water: general characteristics (urban and rural), treatment and distribution, public bathing place sanitation, design and function of water treatment facilities. (Spring)

*103 **Environmental Sanitary Science II** (2) Staff
(Formerly Epid 102)
Recognition and control of environmental pollution. Treatment and disposal of human wastes—excreta, refuse, and air. (Spring)

*104 **Environmental Sanitary Science III** (2) Staff
(Formerly Epid 103)
Dairy products and food sanitation; processing, storage, and distribution of food. Supervision and training of personnel involved with food and the food industry. (Spring)

*105 **Environmental Sanitary Science IV** (2) Staff
(Formerly Epid 104)
Housing, urban and institutional; heating, ventilation, lighting, and noise. Study of federal and municipal regulatory aspects. (Spring)

*106 **Air Pollution Abatement** (2) Staff
(Formerly Epid 105)
Association of air pollution and disease and the effects of major pollutants on people. Air measurement and air measurement techniques demonstrated. (Spring)

109 **Human Behavior** (2) Staff
Theory and techniques of effective communication with patients; counseling and psychotherapy. (Fall)

113 **Medicine and Society** (1) Staff
Survey of the history of medicine, medical ethics, sociological and anthropological aspects of medical practice, major issues facing modern medicine in the United States. (Fall)

116 **Medical Terminology** (2) Cassidy
(Formerly one credit)
Terminology and vocabulary basic to all areas of medical science, hospital services, and allied health specialties. (Fall)

119 **Introduction to Patient Care I** (1) Staff
Patient histories, routine physical examinations, use of the routine equipment of clinical examination. (Fall)

* Open only to students in the undergraduate Environmental Health Program.

*121 **Environmental Biostatistics** (2) **Staff**
(Formerly Epid 121)
Statistical reasoning, collection of data, rates, incidence, and prevalence. Generalization of observations and use of measurement data. (Spring)

*122 **Environmental Epidemiology I** (2) **Staff**
(Formerly Epid 122)
Infectious diseases: bacterial, viral, rickettsial, protozoal, and helminthic. (Spring)

*123 **Environmental Epidemiology II** (2) **Staff**
(Formerly Epid 123)
Zoonoses, deficiency diseases, chronic disease, pneumoconioses, mental health, maternal and child health. (Spring)

*124 **Environmental Epidemiology III** (2) **Staff**
(Formerly Epid 131)
Venereal disease: etiology, clinical manifestations, diagnosis; prevention and control of syphilis, gonorrhea, chancroid, granuloma inquinale, and LGV. (Spring)

125 **Manifestation of Disease** (8) **Staff**
(Formerly seven credits)
Pathologic and abnormal structure and function encountered in clinical disease states. A functional approach to clinical medicine, including sign symptoms and diagnosis of disease states. (Spring)

131 **Human Behavior II** (2) **Staff**
(Formerly one credit)
Continuation of Med 109. Prerequisite: Med 109. (Spring)

134 **Introduction to Patient Care II** (3) **Staff**
(Formerly one credit)
Continuation of Med 119. Prerequisite: Med 119. (Spring)

137 **Dynamics of the Life Cycle** (1) **Staff**
Four hours a week for 20 weeks. Issues surrounding the more controversial topics in modern health care delivery. (Spring)

140 **Clinical-Pathological Correlation** (0) **Staff**
(Formerly one credit)
Three hours a week for 20 weeks. Instruction in the format for case presentations as well as the proper methods used for clinical integration of signs and symptoms of disease. (Spring)

142 **Nursing Seminar I** (2) **Staff**
Integration of clinical science, pathophysiology, pharmacology, and physical diagnosis to facilitate the application of new knowledge and skills to the nursing process and to address issues of role re-identification, team concepts, and legal aspects of nursing.

143 **Nursing Seminar II** (3) **Staff**
Continuation of Med 142.

*Open only to students in the undergraduate Environmental Health Program.

144 **Nursing Seminar III** (1) Staff

Continuation of Med 142 and 143.

146 **Animal Surgery** (3) Staff

Theoretical and actual experiences in the area of surgery. Lectures, demonstrations, and audio-visuals demonstrating proper sterile technique, various ways of controlling hemostasis, types and ways of debridement, and importance of anesthesia and respiratory monitoring in surgery. Basic general surgical techniques such as sponging, suctioning, retracting, knot-tying, etc. Opportunities for student participation in performing surgery on experimental animals using proper surgical techniques, procedures, and skills. Intubations, cutdowns, para- and thora-centeses, debridements, and major surgical procedures such as splenectomies, appendectomies, etc. Students are organized into teams which will shift responsibilities among them, e.g., surgeon, first assistant, anesthesiologist. (Summer)

147 **Introduction to Radiology** (2) Staff

Emphasis on basic language, science, and principles of radiology, including such aspects as safety, positioning, protection-requesting studies, etc. Basic elements of topographic anatomy as applied to radiology. The differentiation of abnormal from normal on chest, abdominal, and extremity films. Basic pattern recognition along with a systematic approach to each X-ray interpretation. Appropriate use and therapeutic and diagnostic value of nuclear medicine studies as well as special procedure studies in radiology. (Summer)

148 **Introduction to Electrocardiography** (2) Staff

Emphasis on the performance of a technically competent electrocardiogram by each student. Basic theory behind electrocardiography as well as interpretation of basic EKG patterns. Common errors of taking and reading EKG's. Identification of common normal and abnormal wave patterns on EKG's. Value and appropriate use of echocardiography and phonocardiography, as well as the principles and technical competence of performing simple exercise tolerance testing. (Summer)

150 **History-taking Review and Theory** (0) Staff

(Formerly one credit)

Theories of taking, presenting, and writing up a competent history; e.g., traditional approach, problem-oriented approach, etc. Techniques for gathering important, yet potentially embarrassing and threatening, areas of the patient's history. Discussion and direct use of a variety of techniques and approaches for collecting historical information from different patient types. Opportunities for live, observed patient interviews, constructively evaluated. Discussion of oral and written presentation of histories taken outside class. (Summer)

151 **Clinical Pharmacology** (2) Staff

(Formerly one credit)

Day-to-day clinical situations for discussion of the appropriate use of some of the more common drugs in a primary care practice. Dosages, actions, routes of administration, indications, and contraindication as applied to the specific clinical examples. Advantages, disadvantages, and reasons for deciding on the primary drug of choice and possible alternative therapy. When and how to use PDR. Review and discussion of the importance and advantages of taking an accurate and complete drug history.

152 **Introduction to Basic Laboratory Medicine** (4) Staff

Theory, performance, and interpretation of some of the more important routine basic clinical laboratory tests that can be performed in a physician's office, such as complete blood counts with differentials, staining and reading smears, urinalysis and urine cultures, routine chemistries (sugar, BUN, electolites), and microbiological culture and staining techniques and organism identification. Lecture and demonstration with appropriate use of audio-visuals. Appropriately supervised and evaluated performance of these tests in a laboratory setting. (Summer)

153 **Gynecology Outpatient: Nurse Practitioner** (3) Staff

154 **Psychiatric Outpatient: Nurse Practitioner** (2) Staff

*155 **Public Health Entomology I** (2) Staff
(Formerly Epid 141)

How the arthropods affect man. Study of host-parasite vector relationships; principles of systematic biology and basic insect taxonomy and toxicology. (Spring)

*156 **Public Health Entomology II** (2) Staff
(Formerly Epid 142)

Identification, life cycles, and bionomics and medically important insects and other arthropods. (Spring)

157 **Primary Care Preceptorship: Nurse Practitioner** (6) Staff

*158 **Public Health Entomology III** (1) Staff
(Formerly Epid 143)

Study of chemical, biological, and mechanical control of all medically important arthropods. (Spring)

*159 **Public Health Entomology IV** (1) Staff
(Formerly Epid 144)

Prevention and control of rodent infestation; identification, habits, and relationship to man. (Spring)

160 **Medical Inpatient** (4) Staff

Six-week required rotation for Physician's Assistant students. Attendance required at all work rounds, teaching rounds, noon conferences, and grand rounds of the medical service. (Fall, spring, summer)

163 **Medical Outpatient** (4) Staff

Six-week required rotation for Physician's Assistant students. Introduction to patient management problems in ambulatory setting.

165 **Medical Outpatient: Nurse Practitioner** (arr.) Staff

166 **Surgical Inpatient** (4) Staff
(Formerly General Surgery [4])

Six-week required rotation for Physician's Assistant students. In-depth experience in management of the pre-operative and post-operative care of the surgical inpatient; attendance required at all surgical rounds. (Fall, spring, summer)

* Open only to students in the undergraduate Environmental Health Program.

169 **Obstetrics and Gynecology** (4) — Staff

Six-week required rotation for Physician's Assistant students. Exposure to outpatient obstetrical and gynecological problems; attendance required at all lectures, rounds, and conferences applicable to staff on the obstetrics-gynecology service. (Fall, spring, summer)

170 **Obstetrics: Nurse Practitioner** (2) — Staff

171 **Pediatrics** (3) — Staff

172 **Pediatric Outpatient** (4) — Staff

Six-week required rotation for Physician's Assistant students. Exposure to ambulatory pediatric medicine. Attendance required at all rounds and conferences.

175 **Primary Care Preceptorship** (12) — Staff

Eight-week required rotation for Physician's Assistant students. Exposure to all aspects of the practice of medicine, including administration, in a community setting; rounds with attending physician in a hospital setting. (Fall, spring, summer)

178 **Emergency Medicine** (4) — Staff

(Formerly Emergency Room)

Six-week required rotation for Physician's Assistant students. Opportunity to deal with acute life-threatening, traumatic, and psychiatric emergencies; emphasis on learning technical skills such as reconstructive suturing; attendance required at all applicable conferences; exposure to surgical and medical emergency management problems. (Fall, spring, summer)

179 **Emergency Room** (2) — Staff

*180 **Practicum in Environmental Health** (12) — Staff

(Formerly Epid 180)

Supervised field experiences in environmental health: food service, housing, water, sewage and solid waste, and infectious diseases; occupational health problems; reports and conferences. Admission by permission of Department Chairman.

*191 **Public Health Administration I** (1 to 3) — Staff

(Formerly Epid 191)

Activities and organization; philosophy, background, and development. Public health activities include vital statistics, laboratory services, education, nursing, and social services. (Spring)

*192 **Public Health Administration II** (1 to 3) — Staff

(Formerly Epid 192)

Administrative considerations, including governmental aspects, legal considerations, fiscal management, personnel factors, and public relations in public health organizations. Prerequisite: Epid 191. (Spring)

*193 **Industrial Hygiene I** (2) — Staff

(Formerly Epid 171)

Chemical hazards: study of diseases from chemical exposure, toxic dusts, metal fumes and vapors, gases, and organic compounds. (Spring)

---

* Open only to students in the undergraduate Environmental Health Program.

*194 **Industrial Hygiene II** (2) **Staff**
(Formerly Epid 172)

Physical hazards: biological effects of low and high temperatures, radiation (electromagnetic, ultraviolet, ionizing), illumination, sound, pressure, and atmospheric pollution. (Spring)

195 **Second Careers in Allied Health** (2) **McCally**

For persons in the second career program. Designed to facilitate student integration into educational routine and to increase student awareness of the health field. Lectures, discussions, guest speakers, and outside readings reinforced by group process. Renewal and development of learning skills necessary to complete the selected training program. Content includes allied health careers, manpower needs, medical terminology, and career and training program planning. (Fall and spring)

198 **Psychiatry** (4) **Staff**
(Formerly three credits)

Six-week required rotation for Physician's Assistant students. Designed to acquaint student with identification and management of psychiatric illness. Attendance required at all lectures, rounds, and conferences.

199 **Independent Study** (4) **Staff**

Four-week required rotation in area chosen by individual student. Objectives for chosen area determined before enrollment. Adviser's approval required for area of study and learning objectives.

300 **Clerkship in Primary Care** **Staff**

For third-year medical students. Training in care of patients in ambulatory setting. Includes participation in University's prepaid health plan (HMO), emergency room, and office practice of general internists, general pediatricians, and family practitioners. Emphasis on skills in specialties which contribute to physician's capacity to care for common minor illnesses. Includes exposure to office practice of orthopaedics, otolaryngology, dermatology, and ophthalmology. Participation with District of Columbia Fire Department in responding to ambulance calls. Lecture series provides foundation for office management of common illnesses managed in ambulatory setting. 8-week elective periods throughout the academic year.

350 **Ambulatory Health Care** **Piemme**

For senior medical students. Involvement in office practice of primary care physician or group of physicians in rural or inner-city area. 4-week elective periods, or, 8-week elective periods during which student participates in project relating to health care delivery. Such projects include medical audit, study of organization of health services, and problems of underserved populations. Exchange with similar program in other institutions is possible, especially for those participating in model family practice units.

360 **Emergency Health Care** **Piemme**

For senior medical students. Assignment to an emergency room in the District of Columbia. Instruction by full-time and resident emergency-room staff. Emphasizes cardio-pulmonary resuscitation and management of trauma, drug overdose, coma, and common illnesses and injuries in emergency care setting. 4-week elective periods.

*Open only to students in the undergraduate Environmental Health Program.

Interdisciplinary Courses

FIRST-YEAR MEDICAL STUDENTS are required to take two interdisciplinary courses: Idis 211 *Cell Biology*, administered by the departments of Anatomy, Biochemistry, and Physiology; and Idis 212 *Neurobiology*, administered by the departments of Anatomy and Physiology.

Staff

211 **Cell Biology**

Same as Anat 211 and Phyl 211. An integrated survey of the structure, function, and metabolism of the cell, as an introduction to the medical sciences.

Staff

212 **Neurobiology**

Same as Anat 212 and Phyl 212. An integrated survey of the structure and function of the human nervous system; lecture, clinical demonstration, and laboratory.

Clinical Sciences, an interdisciplinary program, is required of medical students in the second year. By means of panel discussions, lectures, seminars, case presentations, demonstrations, and examinations of patients, it provides students with basic instruction in various clinical subjects and prepares them professionally and personally for the clinical clerkships and career electives in the third and fourth years. The program is coordinated by a task force appointed by the Committee on Educational Policy of the School of Medicine and Health Sciences. The task force consists of representatives from the departments responsible for teaching courses in the program: Robert Keimowitz *(Chairman)*, Department of Medicine; H.G. Mandel, Department of Pharmacology; Winfield Scott, Dean's Office; F.N. Miller, Jr., Department of Pathology; Brian Doyle, Department of Psychiatry and Behavioral Sciences; and Jack Kravitz, second-year student. In addition to Idis 301 *Introduction to Clinical Medicine* (see below), the program consists of Path 201 *Pathology*, Phar 201 *Pharmacology*, and Pchi 201 *Behavioral Sciences*.

230 **Introduction to Health and Patient Care**

A year course. Four major components: *Emergency Medicine*—12 didactic sessions; skills of elementary emergency medicine and first aid; includes a laboratory in cardiopulmonary resuscitation. *Issues in Health Care*—12 sessions, lecture, symposium, and discussion; introduction to critical issues in the rapidly changing American health-care system; organization of health care, medical economics, medical education, quality of care, ethics, and related issues. *Communication Skills*—nine small-group laboratory sessions; interpersonal communication skills upon which clinical interviewing and counseling are based; film strip demonstrations of effective listening skills and video-tape recall of role-played interviews. *Normal Physical Examination*—four laboratory sessions; opportunity to learn techniques of normal physical examination.

Staff

301 **Introduction to Clinical Medicine**

A year course. An integrated organ-oriented, interdepartmental course providing fundamental instruction in anesthesiology, child health and development, dermatology, gynecology, internal medicine, neurology, obstetrics, ophthalmology, psychiatry, radiology, and surgery; emphasis on

physical diagnosis and laboratory medicine. Includes Life Cycle, dealing with the interpersonal relationships of the physician and his patients and their families.

Medical and Public Affairs

Chairman: Murdock Head

Professor Murdock Head
Professorial Lecturer R.D. Cotton
Associate Professors F.J. Kavanaugh *(Research)*, R.H. Ross *(Research)*
Assistant Professors Elzberry Waters, Jr. *(Research)*, S.F. Fiscina *(Research)*, Phyllis Piotrow *(Research)*, Nina Matheson *(Research)*
Instructor I.C. Mohler, Jr. *(Research)*

351 **Forensic Medicine** Sharpe*, Head, Fiscina

Open to 2nd-year medical students. Examples drawn from the range of problems arising when the professional interests of lawyers and physicians overlap. Problem contexts include malpractice, personal injury litigation, licensure and discipline, ethics and economics, hospitals and other institutions of practice, and compelled treatment. (Fall)

354 **Seminar: Health Care Delivery Systems** (2) Sharpe*, Cotton, Fiscina

The role of lawyers and physicians in national health care legislation-making: issues of design, finance, and administration; problems in reconciling the expectations of the users and providers of health care services. Limited enrollment. (Spring)

Medicine

Chairman: W.N. Jensen
Associate Chairman: G.A. Kelser, Jr.
Directors of Divisions: Halla Brown *(Allergy)*, G.A. Kelser, Jr. *(Cardiology)*, W.O. Dobbins III *(Gastroenterology)*, L.S. Lessin *(Hematology-Oncology)*, Kenneth Becker *(Metabolic and Endocrine Diseases)*, J.P. Naughton *(Rehabilitation Medicine)*, A.E. Parrish *(Renal Diseases)*, W.R. Felts, Jr. *(Rheumatology)*

---

*Dr. Sharpe is Professor of Law in the University's National Law Center.

Professors M.J. Romansky, J.M. Evans, C.S. Tidball *(Research)*, A.E. Parrish, F.W. Wolff, Irene Tamagna, J.J. Feffer, W.N. Jensen, T.E. Piemme, Leon Bernstein, J.P. Naughton, G.A. Kelser, Jr., H.V. Pipberger, H.J. Zimmerman, J.A. Curtin, D.J. Massaro, R.P. Kaufman, Tsung O. Cheng, Joseph Lindsay, Jr., R.J. Bulger, Fred Leonard *(Research—Rehabilitation Medicine)*, W.O. Dobbins III, J.M. Bacos, E.R. Simon, Ariel Hollinshead *(Research—Pharmacology)*, N.C. Kramer, J.D. Finkelstein, L.S. Lessin, W.P. Baker, W.J. Jacoby, W.M. Lukash, Jonas Sode, David Reiss

Clinical Professors A.G. Prandoni, J.J. Rheingold, T.S. Sappington, A.B. Rosenbaum, T.J. Greenwalt, Benjamin Manchester, L.E. Putnam, M.H. Stolar, C.W. Thompson, Milton Gusack, S.M. Fox III, H.E. Ratcliffe, E.P. Parker III, H.M. Silver, S.D. Loube, C.A. Rosenberg, M.S. Artenstein, Joseph Ney

Associate Professors W.R. Felts, Jr., Irene Hsu, J.B. O'Connell, Lawrence Pierce, K.L. Becker, Mahmoud Mourad, A.F. Mastellone *(Physical Medicine)*, Karl Wipplinger, Gloria Eng, V.T. DeVita, M.J. Jackson *(Research)*, P.A. Gorman, J.C. Rios, W.F. Barth, James Stengle, W.H. Scott, Philip Witorsch, Robert Keimowitz, John LaRosa, Gloria Massaro *(Research—Pulmonary Diseases)*, Riaz Haider *(Research)*, C.M. Voyles, D.S. O'Leary, Geraldine Schechter, S.A. Schroeder, W.P. Fortune, B.M. Domm, R.C. Elliott, Daniel Weiner

Associate Clinical Professors J.W. Latimer, Jr., H.D. Ecker, C.W. Jones, Maurice Mensh, F.J. Murray, M.H. Rosenberg, Jack Kleh, J.P. Mann, Edward Adelson, Arthur Ruskin, L.J. Thomas, W.O. Bailey, Jr., Ruth Benedict, S.W. Kirstein, Israel Kessler, W.D. Brill, Marvin Fuchs, C.A. Schulman, Alfred Baer, Bertel Nelson, J.M. Pisani, S.W. Bush, Joseph King, M.H. Jacobson, Raymond Standard, Henry Simmons, E.J. Leonard, Joseph Fenton *(Clinical Psychology)*, Peter Birk, R.B.W. Smith, L.B. Hobson, S.H. Danovitch, A.W. Danish, A.A. Lear, O.W. Donnelly, S.J. Talpers, Raymond Scaletar, R.W. Wilkinson, M.S. Wolfe, D.A. Morowitz, N.L. Christopher, G.H. Nachnani, R.A. Fischer, R.M. Kaufman, M.J. Stern, N.P. Trujillo, L.M. Weiss, R.K. Sarin, Daniel Ein, D.A. O'Kieffe

Associate Professorial Lecturers J.C. Penhos *(Endocrinology)*, R.R. Blanck

Assistant Professors P.M. Berkman, C.H. Chan, D.H. Goodman, W.S. Chiu, M.H. Cohen, J.F. Meyer, P.O. Periman, K.J. Dickie, J.R. Whiteman *(Research)*, Anne Thompson, G.M. Gacad, R.A. Goldstein, P.P. Klug, R.A. Noble, Barbara Sherwin, S.V. Spagnolo, Jean Vazuka, J.E. Zimmerman, Philip Assatourians, J.A. Snow, S.H. Mendelson, Atin Guha, B.E. Fosseick, Jr., A.L. Ginsberg, J.B. Crandall, H.J. Gorfinkel, H.B. Marsh *(Cardiology)*, A.A. Oboler, D.R. Rosing, E.W. Sutherland III, K.H. Chase, J.B. Taylor, Dorothy Gail *(Research)*, Michelle Warren, March Enders *(Rehabilitation Medicine)*, Bryan Arling, F.H. Corcoran, R.D. Gaskins, L.P. Georges, Kenneth Goldstein, R.B. Johnson, K.E. Joslyn, J.E. McWhorter IV, Elliott Perlin, Irwin Sher, Kalisankar Mallik *(Research)*, L.L. Vertuno, M.W. Yokum, W.H. Lipshutz, H.B. McCormick, Omega Silva, Francisco Tejada

Assistant Clinical Professors David Horwitz, S.T. Gibson, M.H. Rose, Adolph Friedman, J.W. Long, T.L. Hartman, Boris Rabkin, L.A. Craig, Jr., Alvin Seltzer, C.E. Law, Sr., H.O. Mott, N.H. Rubenstein, B.H. Ostrow, W.R. Ehrmantraut, G.A. Chapman, Silas Babin, Jr., Jack Crowell, D.S. Davis, F.K. Harris II, R.F. Dyer, William Lewis, H.I. Passes, R.S. Poole, H.C. Sadin, W.L. Hall, M.A. Sislen, G.C. Buchanan, G.T. Economos, Irwin Ardam, S.E. Barr, H.A. Moskovitz, J.T. Hagenbucher, G.N. Polis, Jean Lucas, Frances

Chucker, L.H. Biben, W.H. Harvey, William Kurstin, Dorothea Chapman, L.H. Fenton, Paul Schlein, D.J. Hand, P.A. Haber, Guiseppe Balsamo, G.J. Thorpe, Bernard Grand, Cesar Rudzki, H.C. Singer, E.B. Thompson, Richard Schoenfeld, P.R. Lenz, M.M. Shelferman, A.M. Mondzac, S.J. Wolin, Bernardo Kotelanski, R.J. Karpick, G.L. Adams, M.S. Maillis, W.Y.K. Goo, M.J. Halberstam, J.F. Mermel, S.N. Richman, T.P. Dwyer, S.M. Fidler, Alfred Muller, R.A. Ratner, Amiel Segal *(Hematology-Oncology)*, R.B. Castell, B.L. Manalo, P.G. Ventry, R.G. Knodell, M.J. Haut, William Mallin, R.A. Nicklas, R.F. Cioffi, Frederick Meyers, R.W. Turner, S.A. Schwartz, L.F. Barker, D.D. Haut, A.J. Anderson, P.P.L. Chang, P.V. Holland, H.S. Mirsky, Mark Donowitz, G.R. Irwin, J.A. Kark, R.L. Lavine, J.N. Ramey, D.B. Simon, J.S. Skyler, R.A. Noble, S.M. Phillips, H.T. Yates, Jr., H.A. Schwartz, Gloria Werth, Philip Cohen, Carl Goldberg *(Psychology)*

Instructors I.C. Mohler Jr. *(Research)*, R.E. Rose *(Research)*, C.J. Bier, M.D. Delaney, Agnes Fry *(Research)*, R.A. Muesing *(Research)*, Jahangir Cyrus

Clinical Instructors N.K. Bohrer, N.G. Goodman, Lily Ruckstuhl, Robert Kramer, F.J. Borsody, D.W. Datlow, R.M. Huffman, L.P. Appel, M.A. Herman, Isaac Weiszer, N.T. Connally, J.C. Perkins, H.J. Alpert, S.R. Rishi, Israel Spector, B.G. Vlalukin, Devanhalli Ramaswamy, Dorothy Millon, N.A. Crane, N.S. Otchin, Mark Greene, Byung-Il Choi, Nicholas Mendjuk, P.S. Spiegler, Valery Miller, I.V. Magal, R.A. Berenson, W.D. Lassek, J.A. Sandler, J.M. McGinnis, Nancy Falk, T.C. Havell II, Morton Kavalier, M.G. Mukhopadhyay, Michael Phillips, Joel Taubin, B.P. Tinker, Ann Williams, S.P. Staal, M.J. Fliegelman, Nelinda Gonzalez, B.E. Lessin, M.F. Mullarkey

Special Lecturers Sol Katz *(Pulmonary Diseases)*, D.S. Fredrickson *(Internal Medicine)*, W.C. Roberts *(Cardiology)*, B.W. Janick

303 Computers in Clinical Cardiology — **Rios, Rose**

Emphasis on development of computer programs applicable to clinical cardiology. Students given opportunity to develop original applications programs or to interact with staff in programming and validation of automated systems for the analysis of intracardiac electrocardiography, noninvasive cardiological techniques, exercise electrocardiography, etc. Basic knowledge of FORTRAN needed. Personal interview required. Limited to two students. 4- or 6-week elective periods. Univ. Hosp.

***305 Inpatient Clerkship** — **Staff**

Training in comprehensive study of patients; history and physical examination; ward rounds, consultations, conferences, preceptorial teaching, seminars. V.A., Univ. hosps., and Wash. Hosp. Center (12-week periods throughout academic year)

***308 Outpatient Medicine and Emergency Room** — **Staff**

Care of ambulatory patients and emergency cases under close supervision. Daily clinics in general medicine and various specialties; conferences on current cases. Univ. Clinic and Hosp. Emergency Room (8-week periods throughout the academic year)

* Required for medical students.

324 Immunology — Periman

Clinical, laboratory, and research aspects of immunology. Readings for weekly seminar; emphasis on basic immunological techniques and the immunological basis of appropriate disease entities. Opportunity for independent, supervised research. 8-week elective periods. Permission of instructor required. Univ. Clinic

330 Advanced History and Physical Analysis — Lewis

Students function as interns; emphasis on the true merit of the case history and physical examination versus diagnosis by laboratory data. 8-week elective periods.

332 Acting Intern in Medicine — Arling

Student is assigned to a patient-care team by the Medical Chief Resident. Under supervision of ward resident and attending physician, the student assumes an intern's responsibility for completing initial patient evaluation data base, writing medical orders, (which must be cosigned by an M.D.), coordinating patient's care, writing progress notes, and dictating the discharge summary. Average patient load is six, allowing student sufficient time to study patient problems as well as to attend Medical Service conferences. Group matches with Med 333 and 334. Univ. Clinic

333 Acting Intern in Medicine — Curtin

Student works with a patient-care team on a medical ward, does initial evaluation and presents patient's problem at attending rounds and at appropriate teaching conferences, under the supervision of the medical resident and the attending physician. Subspecialty consultations also review patient's problem with the student. 4- or 8-week elective periods. Wash. Hosp. Center

334 Acting Intern in Medicine — Zimmerman

Student assigned to a patient-care team under direct supervision of a University resident on general medical wards. Problem Oriented Medical Record System used. Students complete initial patient evaluation data base and are responsible for patient management during hospitalization. Students write all orders, which must be reviewed and cosigned by the resident. Students are expected to present their patients at attending rounds and conferences. Close supervision and guidance by the team resident and attending physician will be enhanced by subspecialty consultants. Interview required. 4- or 8-week elective periods. V.A. Hosp.

336 Acting Intern in Intensive Care Medicine — Curtin

Student works on intensive care unit. 4- or 8-week elective periods. Wash. Hosp. Center

350 Clinical Infectious Diseases — Parker

Fundamental concepts in the diagnosis and treatment of bacterial, viral, fungal, and mycobacterial infections. Students take primary responsibility in seeing consultations; familiarization with advantages and limitations of laboratory techniques used to diagnose and manage infectious disease problems. Review of consultations seen by students by resident and full-time faculty members. Introduction to hospital infection surveillance program. 4- or 12-week elective periods. V.A. Hosp.

352 Clinical Cardiology — Hsu and Staff

Experience in ambulatory and hospitalized patient care: ECGs, graphics,

CCU, exercise laboratory; observation in catheterization laboratory and participation in hypertensive research clinic. 8-week elective period. Univ. Clinic

353 **Clinical Cardiology** — Manchester

Observation of and participation in the diagnosis and clinical management of cardiovascular disorders. Acquaintance with physical signs of heart disease. Exposure to noninvasive diagnostic procedures, echo-, phono-, apex-cardiography; interpretation of electrocardiograms and chest X-rays; ward rounds in intensive coronary care unit. 8-week elective periods.

358 **Clinical Cardiology** — Bacos, Mendelson, Marsh, Oboler

(Formerly Introduction to Cardiology)

Bedside evaluation is emphasized and correlated with special diagnostic studies, including stress testing, phono-cardiography, echo-cardiography, cardiac catheterization, angiography, etc. 4-week elective periods. Wash. Hosp. Center

359 **Coronary Care Unit** — Bacos, Mendelson, Marsh, Oboler

(Formerly Introduction to Acute Coronary Care)

Participation in patient care. Students work closely with house staff and attending staff. Emphasis on diagnosis and treatment of coronary disease, complications of infarction, diagnosis and treatment of arrhythmias, and selection of patients for surgical intervention. 4-week elective periods. Wash. Hosp. Center

360 **Clinical Cardiology** — Fletcher*

Experience in clinical cardiovascular problems under supervision of cardiology staff. Emphasis on history, physical diagnosis, and noninvasive cardiovascular techniques. Role of cardiac catheterization explained and results in specific cases discussed. Electrocardiography covered as one of the tools used to approach the cardiovascular patient. Patient management is integral part of course. Teaching rounds and conferences. 4- or 8-week elective periods. V.A. Hosp.

363 **Cardiac and Medical Intensive Care** — Saunders†

Students will take call every third night with a resident/intern team. Participation in all aspects of coronary care; use or familiarization with special unit techniques such as cardioversion, pacemakers, Swanz-Ganz catheters, intra-aortic balloon counterpulsation, and mechanical ventilators. Opportunity to manage, under close supervision, a spectrum of other non-cardiac medical emergencies in critically ill patients. 4-week elective periods. V.A. Hosp.

364 **Cardiovascular Data Processing** — Pipberger

Study of a variety of modern computer techniques; primary research in computer analysis of electrocardiograms. 4- or 8-week elective periods. V.A. Hosp.

* Dr. Fletcher is Chief of Cardiology at the Veterans Administration Hospital.
† Dr. Saunders is Chief of Medicine for Intensive Care at the Veterans Administration Hospital.

365 **Clinical Electrocardiography and ECG Computer Analysis** — Pipberger

Participation in daily computer processing and analysis of all electrocardiograms from two V.A. hospitals and Children's Hospital, D.C. ECG findings correlated with clinical data from all problem cases. Daily review sessions with Section Chief and cardiac fellows. Participation in weekly seminars and a Journal Club. 4- or 8-week elective periods. V.A. Hosp.

371 **Endocrinology** — Shapiro

Student evaluates patients referred to the endocrinology service, takes part in planning diagnostic work-ups or therapy programs, and is responsible for case presentations of patients he has worked up. Exposure to techniques used in the endocrinology laboratory, such as protein binding determinations and radio-immuno assay of hormones; participation in Journal Club 2 mornings a week and in weekly conferences. The student is expected to assume prime responsibility for directing patient evaluations. 4-week elective periods. Wash. Hosp. Center

373 **Endocrinology and Metabolism** — Becker

Clinical experience in endocrinology and metabolism. Students examine endocrine patients, make preliminary diagnoses, and assist in treatment. Clinical rounds daily; weekly endocrine clinic, diabetic clinic, and Journal Club participation; laboratory and research experience available. 4- to 12-week elective periods. V.A. and Univ. hosps.

375 **Endocrinology Research** — Becker and Staff

Participation in endocrinology and metabolism research laboratory. Introduction to chemical and technical aspects of endocrine research. Participation in ongoing research activities. Students learn appropriate procedures, such as radioimmunoassay of hormones, histopathologic technics, atomic absorption spectrophotometry, and investigative approach to solving research problems. Prior interview with instructor suggested. 8-week elective periods. V.A. Hosp.

376 **Metabolic Disorders in Diabetes** — Penhos

Intensive and practical studies of the technique to produce surgical, chemical, and hormonal diabetes. Participation in research on carbohydrate, protein, and lipid metabolism, insulin secretion in isolated organ perfusions. Seminars and participation in Journal Club; discussions on the results obtained. 4-week elective periods. V.A. Hosp.

381 **Research in Endocrinology** — Penhos

Participation in endocrine research, including laboratory experience, experimental surgery, biochemical methods, and *in vivo* and *in vitro* endocrine studies. Weekly seminars and discussions correlate experimental results with clinical observations. 4-week elective periods. V.A. Hosp.

385 **Biochemical Abnormalities in Disorders of Lipoprotein Metabolism** — LaRosa

Current research directed toward the biochemical purification of enzymes responsible for removing lipids from the plasma and a study of the possible relationship between induction of these enzymes and the progestational and estrogenic components of currently used birth control pills. Experience in the use of modern techniques of protein separation, including ultracentrifugation, electrophoresis, and chromatography; experience in hand-

ling radioactive isotopes. Clinical experience with patients who have hyperlipoproteinemia. 12-week elective periods. Nat'l. Heart and Lung Institute, NIH, and Univ. Hosp.

387 **Diabetes Research Laboratory** — **Recant***

Research oriented toward the patient with diabetes mellitus. Studies in humans, laboratory animals, isolated perfused organs, and isolated tissue *in vitro*. Diagnostic studies for hypoglycemia and hyperglycemia. Consultations and rounds on patients with problems in carbohydrate or lipid metabolism. Weekly conferences. 12-week elective periods. V.A. Hosp.

390 **Extramural Internal Medicine Elective** (arr.)

The Department arranges for students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

391 **Clinical Oncology** — **Cohen**

Participation in clinical management of patients with carcinoma on the medical oncology ward. 8- or 12-week elective periods. V.A. Hosp.

393 **Medical Oncology** — **DeVita**

Experience in current methods in evaluation and treatment of lymphomas, chronic leukemias, ovarian, breast, and other malignancies, including a view of the broad spectrum of these diseases. Participation in patient care and laboratory studies of current research in clinical pharmacology, tumor kinetics, and *in vitro* marrow culture techniques. 8-week elective periods. Nat'l. Cancer Institute, NIH

396 **Clinical Pharmacology** — **Wolff**

Introduction to clinical pharmacology and toxicology as the basis of the regulatory work of the Food and Drug Administration. Collaboration with a team of scientists dealing with the review of investigational new drug applications and new drug applications, with a drug experience reporting system, and with annual reviews of drugs in specific areas, emphasizing study of the benefit/risk ratio. Project work in a toxicology laboratory. Interview required. 12-week elective periods. Bureau of Drugs, FDA

397 **Clinical Pharmacology of New Antineoplastic Agents** — **Creaven**

Study in the medical oncology section; emphasis on clinical therapeutics and the use of biochemical or other methodology for the determination of drug uptake, metabolism, excretion, and assay of marker substances as indicators for tumor response. 8- or 12-week elective periods. V.A. Hosp.

402 **Research in Cancer Immunology** — **Hollinshead**

Laboratory experience with tests used to correlate cellular anti-tumor reactivity to solid tumors with the clinical course of the disease; experiments to investigate viral etiology of certain forms of cancer; study of fetal antigens and role in oncogenesis; cell membrane antigens specific for leukemia. 1 senior; 8-week elective periods. Ross Hall

*Dr. Recant is Chief of the Diabetes Research Laboratory at the Veterans Administration Hospital.

403 **Research in Cancer Immunology** — Periman

Emphasis on attaining a background in the advancements of the last 20 years which have led to immunodiagnostic and immunotherapeutic techniques for cancer. Further research opportunities available. Weekly seminars. Permission of instructor required. 8-week elective periods.

412 **Clinical Gastroenterology** — Danish

Work in a suburban office devoted to private partnership practice of internal medicine with emphasis on gastroenterology. Hospital rounds, evaluation of problems, discussion with attending physician and/or patient in terms of diagnosis and therapy, observation of and assistance in specialized procedures, practical aspects of office management. 4- or 8-week elective periods.

413 **Clinical Gastroenterology-Hepatology** — Dobbins, Ginsberg

Intensive clinical experience with patients who have digestive disease, including those of the gastrointestinal tract, liver, and pancreas. Patient consultations, teaching rounds, seminars. Joint conferences with surgery, pathology, and radiology emphasize the multidisciplinary approach in digestive diseases. 4- or 8-week elective periods. Univ. Clinic

414 **Clinical Gastroenterology-Hepatology** — Finkelstein

Students see patients referred to the gastroenterology-hepatology section for consultation and are responsible for initial evaluation and the follow-up of these patients. Participation in all specialized procedures including various biopsy techniques and endoscopies. Teaching rounds, conferences, seminars. Student elects to concentrate in either gastroenterology or hepatology. 4- or 8-week elective periods. VA Hosp.

423 **Clinical Gastroenterology** — Trujillo

Introduction to clinical problems in diagnosis and treatment of gastroenterology in both office and hospital practice. Peritoneoscopy, endoscopy, and biopsies. 4-week elective periods. Univ. Hosp.

424 **Morphology of the Liver and Intestines** — Dobbins

Research designed to acquaint the student with a variety of morphologic techniques used in the study of mucosal disease of the gastrointestinal tract. Includes electron microscopy and light microscopy techniques—phase and fluorescent microscopy. Preference given to student able to continue on a part-time basis following completion of the elective. 8-week elective periods. Univ. Clinic

426 **Research in Metabolism of Sulphur Amino Acids** — Finkelstein

Study of methionine metabolism in mammalian tissues using several research techniques: kinetic properties of purified enzymes; induction and repression of enzymes by hormones and diet; metabolism of methionine in the isolated perfused rat liver. Projects available in any of the above areas and will be developed further to meet student needs. 12-week elective periods. V.A. Hosp.

430 **Clinical Hematology** — Schechter*

Study of the methods for evaluation and treatment of patients with hema-

* Dr. Schechter is a member of the Hematology Section at the Veterans Administration Hospital.

tological disorders. Ward rounds, morphology review sessions, participation in hematology clinic and Journal Club. 4-week elective periods. V.A. Hosp.

431 **Clinical Hematology and Oncology** — Lessin and Staff
(Formerly Clinical Hematology)
Participation in the diagnosis and therapy of hematologic and oncologic disorders, including inpatient and outpatient consultations, daily care, and follow-up of clinical hematologic problems. Emphasis on acquainting the student with modern hematologic diagnostic procedures and current literature. 4- or 8-week elective periods. Univ. Hosp. and Clinic

432 **Clinical Hematology** — Pierce
Clinical evaluation of inpatients and outpatients with symptoms referrable to the myelopoietic system using bedside and laboratory investigative parameters. 4-week elective periods. Wash. Hosp. Center

433 **Hematology** — Rheingold
Observation of and participation in diagnosis and treatment of patients with hematologic disorders. 4-week elective periods. Physician's office.

435 **Hematology Research** — Lessin and Staff
Participation in the hematology research laboratory. Emphasis on development of the student's own project related to dynamic morphology of the blood cells, blood cell ultrastructure, and electron microscopy techniques. Introduction to red cell rheology and physiology. 8-week elective periods. Univ. Hosp.

436 **Hematology Research** — Schechter*
The main research deals with lymphocyte biology, in particular blastogenesis, macrophage interactions, and reaction to blood transfusions in man. Facilities available to do *in vitro* human and animal tissue cultures, radioisotopic studies, and electron microscopy. 8- or 12-week elective periods. V.A. Hosp.

437 **Blood Transfusion in Clinical Practice** — Greenwalt
Demonstration and discussion of the preparation, properties, and clinical use of all blood components and of the basic genetics and immunology of the blood groups and allotypes. Opportunity to perform bench work in resolving immunologic transfusion problems. 4-week elective periods.

440 **Pulmonary Medicine** — D. Massaro
Introduction to the diagnosis and treatment of diseases of the lung; experience in the management of patients with acute respiratory failure. Participation in daily ward rounds with a full-time faculty member and in weekly pulmonary grand rounds and the lung seminar series. Work-up of patients with various pulmonary disorders, including pulmonary function testing, arterial blood gas studies, exercise studies, and other techniques. 4- or 8-week elective periods. V.A. Hosp.

442 **Pulmonary Diseases** — Witorsch
Performance and interpretation of pulmonary function studies, including

* Dr. Schechter is a member of the Hematology Section at the Veterans Administration Hospital.

ventilatory, diffusing capacity, and blood gas analysis; daily teaching rounds and supervised consultation on patients with various pulmonary and infectious diseases. Participation in pulmonary clinic; techniques and principles of inhalation therapy. Principles of and experience with respiratory failure and respiratory intensive care. 4-week elective periods. Wash. Hosp. Center

447 **Research in Pulmonary Diseases** — D. Massaro

Detailed studies of the synthesis and regulation of lung surfactant, mechanisms of airways obstruction, or immunological aspects of lung disease. 12-week elective periods. V.A. Hosp.

451 **Arthritis and Rheumatic Diseases** — Felts

Introduction to clinical problems in the diagnosis and treatment of arthritis and rheumatic diseases. Emphasis on patient evaluation and establishment of therapeutic priorities. 4-week elective periods. Univ. Clinic

452 **Clinical Rheumatology** — Alepa*

Active participation in work-up and management of inpatients and clinic patients with rheumatic diseases. History, physical examination, differential diagnosis, immunological mechanism, X-ray reading, and use of laboratory tests are stressed. Laboratory facilities available with emphasis on immunology. 4-week elective periods. V.A. Hosp.

453 **Introduction to Arthritis** — Barth

Work-up, rounds, clinic, and consultations on patients with arthritis and rheumatic diseases. Daily discussions on selected topics in rheumatology, including clinical immunology, major disease categories (SLE, RA, gout, etc.); differential diagnosis, drug therapy, serological reactions, X-ray changes. 4-week elective periods. Wash. Hosp. Center

454 **Total Patient Care** — Tamagna

Participation in total patient care program, including medical rehabilitation and group evaluation conferences. 4-week elective periods. Univ. Hosp.

455 **Physical Medicine and Rehabilitation** — Chiu, Mourad, Enders

Participation in all activities in inpatient and outpatient diagnosis, treatment, consultation, and EMG. 4-week elective periods. Univ. Hosp.

456 **Psychomatic Medicine** — Naughton, Scott, Stern, Tompkins, Wolin

Experience in psychomatic problems. Orientation to areas of cardiovascular diseases and alcoholism. 4-week elective periods. Univ. Clinic

460 **Renal and Electrolyte Disorders** — Berkman

Participation in consultations on renal and electrolyte abnormalities; follow-up of patients. Examination of the urinary sediment and in peritoneal and hemodialysis. Conferences, reading assignments, ward rounds, participation in Journal Club. Student may participate in a research project during an extended elective period. 4-week elective periods. Wash. Hosp. Center

---

* Dr. Alepa is Chief of the Rheumatology Section at the Veterans Administration Hospital.

461 **Clinical Renal Disease** Parrish, N. Kramer, Guha

Participation in clinical and laboratory procedures used in the study of renal disease. Ward rounds, consultations, conferences, seminars. 4-week elective periods. Univ. Hosp.

463 **Clinical Application of Tissue Immunology** N. Kramer

Application of immunologic methods to the study of human hypersensitivity states and metabolic diseases; study of serum proteins, including protein hormones and enzymes; research principles and methods; tissue typing and flourescent antibody methods. 4-week elective periods. Univ. Hosp.

465 **Renal Diseases and Fluid and Electrolyte Problems** Jacobson

Participation in office and hospital consultations; care of patients with renal diseases and fluid and electrolyte problems. Student becomes familiar with a variety of renal problems; works up patients with renal disease; evaluates renal function studies. Emphasis on critical use of medical literature. One student. 4- or 8-week elective periods.

469 **Clinical Renal Disease** Shalhoub*

Broad exposure to and active participation in all the clinical activities of the renal section, including consultations, hemodialysis, outpatient clinic, rounds, conferences, and Journal Club meetings. 4- or 8-week elective periods. Time period must first be cleared through instructor's office. V.A. Hosp.

483 **Nuclear Medicine** Sauerbrunn†

Introduction to radioisotope methodology as applied to diagnostic or therapeutic problems in medicine. Study of the unique properties of radioactivity, radiation safety, and instrumental uses in the detection of radiation. Evaluation of patients referred for diagnostic and therapeutic studies. Student may choose a selected field of interest for more intensive study and may engage in limited participation in on-going clinical research projects. 12-week elective periods. V.A. Hosp.

485 **Biochemical Endocrinology** Skyler

Student develops research project or participates in ongoing research project. Emphasis on experimental design and techniques used in solving modern medical problems. One senior (any time). Permission of instructor required. 12-week elective periods. (September through May) NIH

490 **Cardiovascular Research** Taylor

Participation in various ongoing cardiovascular research projects in areas of exercise physiology, arrhythmias, and patient education systems. Introduction to clinical cardiology with some opportunity for observation of and participation in diagnosis and treatment of patients with cardiovascular diseases. 8-week elective periods. Univ. Hosp.

*Dr. Shalhoub is Chief of the Renal Section at the Veterans Administration Hospital.
†Dr. Sauerbrunn is Chief of Nuclear Medicine at the Veterans Administration Hospital.

495 **Oncology Review** — Hollinshead

Each student assigned a carefully selected reading list on one form of cancer. Fundamentals, basic research, and latest clinical approaches discussed in detail. Student will write and illustrate a review of his or her subject. Interested students encouraged to undertake their own research project the following summer. 4-week elective period.

Microbiology

Chairman: L.F. Affronti

Professors Mary Louise Robbins, Rudolph Hugh, E.M. Lerner II *(Research)*, L.F. Affronti
Professorial Lecturer Dorothy Heilman *(Cellular Immunology)*
Associate Professors Melvin Reich, Kun-yen Huang, Phyllis Kind
Assistant Professors Yang-Ming Chu, Rosalie De Giovanni-Donnelly *(Research)*

106 **Environmental Science of Nosocomial Infection** (1) — Staff
(Formerly Epid 106)
Developing a surveillance protocol for nosocomial infection. Microbiological assay of the animate and inanimate components of the hospital environment. (Spring)

128 **Microbiology for New Health Practitioners** (2) — Staff
(This course is one-third of former Med 128 Mechanisms of Disease [6])
Lecture course. Basic concepts in microbiology. Topics include structure and morphology of microbial cell and types of bacteria commonly encountered in wound infections and in localized infections of the respiratory tract. (Fall and spring)

151 **Public Health Microbiology I** (3) — Staff
(Formerly Epid 151)
Medical parasitology, protozoology (intestinal), the Haemosporidia (malaria), the Haemoflagellates and the metazoa (helminths) of medical importance. (Spring)

152 **Public Health Microbiology II** (2) — Staff
(Formerly Epid 152)
Clinical bacteriology, characteristics and identification of the bacteria involved in disease, study of rickettsia and viruses. (Spring)

153 **Public Health Microbiology III** (2) — Staff
(Formerly Epid 153)
Study and identification of the flora of water, dairy products, food, and the atmosphere. (Spring)

154 **Public Health Microbiology IV** (1) — Staff
(Formerly Epid 154)
Mycology: study of medically important fungi, systematic mycoses and dermatomycoses. (Spring)

*201 **Medical Microbiology** (6) Staff

For medical students; open to qualified graduate students by special permission. Bacteria, rickettsiae, viruses, yeasts, molds, protozoa, metazoa which relate to the health and disease of man—cultural studies, methods of diagnoses, theories. Laboratory fee for nonmedical students, $16. (Spring)

211 **Microbiology** (4) Staff

For graduate students. Bacteria, fungi, rickettsiae, immunological concepts, and viruses. Laboratory fee, $16. (Fall)

212 **Pathogenic Microbiology** (4) Staff

For graduate students. Continuation of Micr 211; emphasis on pathogenic activities of microorganisms. Prerequisite: Micr 211. Laboratory fee, $16. (Spring)

214 **Tissue Cell Culture and Somatic Variation** (4) Chu

Techniques of tissue culture and means of studying somatic variations. Prerequisite: Micr 211 or equivalent. (Spring)

219–20 **Scientific Writing for Graduate Students** (1–1) Robbins

Required of all graduate students prior to writing a thesis or dissertation. Some research experience required. (Academic year)

223 **Antimicrobial Chemotherapy** Affronti, Reich

For medical students. Lecture course. Selection, clinical applications, and mechanism of action of various drugs and antibiotics used in the treatment of microbial infections. Members of the clinical faculty discuss relevant aspects of clinical chemotherapy. Prerequisite: Micr 201. (Fall)

225 **Microbial Physiology I** (3) Reich, Affronti

Morphology and biochemistry of various microorganisms with emphasis on bacteria. Prerequisite: Bioc 201 or 221–22; Micr 211 or equivalent. (Fall)

226 **Microbial Physiology II** (3) Reich, Affronti

Effects of physical and chemical agents on microorganisms with emphasis on antibiotics. Prerequisite: Micr 225 or permission of instructor. (Spring)

229 **Immunology** (3) Kind, Affronti

Lecture course. Fundamental immunologic concepts. Lectures will cover antigens, antibodies, antigen-antibody reactions *in vitro* and *in vivo*, and the immune response. Prerequisite: Micr 211 or permission of instructor.

230 **Immunology Laboratory** (2) Kind, Affronti

Serologic and immunologic procedures as applied to clinical and research situations emphasized. Prerequisite or concurrent registration: Micr 229 or permission of instructor. Laboratory fee, $16. (Fall 1975 and alternate falls)

*Required for medical students.

231 **Immunobiology** (1) Affronti, Kind

Lecture course. Study of immunological functions of reticulo-endothelial tissues, theories of autoimmunity, graft rejection, tumor immunity, delayed hypersensitivities, and immunogenetics. Members of the clinical faculty discuss relevant aspects of immunobiology. For medical students; open to graduate students by permission of instructor.

233 **Biology of Viruses** (2) Robbins, Huang

Biochemical and genetic characterization of viruses. Prerequisite: Micr 211 or equivalent. (Fall)

234 **Biology of Virsuses—Laboratory** (2) Robbins, Huang

Laboratory complement to Micr 233. Prerequisite or concurrent registration: Micr 233. Laboratory fee for nonmedical students, $20. (Fall)

235 **Systematic Bacteriology** (2) Hugh

History of bacterial classification, international rules of nomenclature as applied to bacteria, development of bacterial classification based on relationships, survey of characteristics of bacterial groups. Prerequisite: Micr 201 or 212; or equivalent. (Fall 1976 and alternate falls)

251 **Clinical Laboratory Bacteriology** (3) Hugh

For graduate students; open to medical students. Detection and identification of bacterial agents which cause diseases in man. Comparative isolation and identification methods; emphasis on interpretation and significance of laboratory observations. Prerequisite: Micr 201 or equivalent. (Fall)

255 **Virology** (1) Huang

Primarily elective course for medical students; open to graduate students. General principles of virology; emphasis on clinical situations. Prerequisite: Micr 201 or equivalent. (Fall)

257 **Experimental Immunochemistry** (3) Affronti

Biochemical and physiochemical characterization of antigens and antibodies. Prerequisite: Bioc 221–22 or equivalent, Micr 229. Laboratory fee for nonmedical students, $20. Limited enrollment. (Spring 1976 and alternate springs)

258 **Microbial Genetics** (2) De Giovanni-Donnelly

Survey of microbial systems that depict basic concepts of genetic principles. Prerequisite: Micr 211 or equivalent. (Spring)

260 **Cellular Immunology** (1) Kind

Advanced seminars in cellular aspects of the immune response. Prerequisite: Micr 229.

277–78 **Seminar: Microbiology** (1–1) Staff

Required of graduate students. (Academic year)

280 **Virology** Huang, Robbins

Selected problems; library assignments, laboratory studies. 8-week elective periods.

281 **Biological Basis of Infections** Affronti, Reich

Selected problems; library assignments, laboratory studies, term paper. 4-week elective periods.

282 **Immunology** Kind

Selected problems, library assignments, laboratory research. 4-week elective periods.

283 **Bacteriology** Hugh

Selected problems; library assignments, laboratory studies, term paper. 8-week elective periods.

284 **Microbial Genetics** De Giovanni-Donnelly

Selected problems, library assignments, laboratory studies, term paper. 4-week elective periods.

285 ***In vitro* Study of Immune Responses** Chu

Preparation of specific antigens from a cell strain and production of antibodies against this strain in appropriate mammalian host; identification of unknown cell types using tissue culture, serology, immunochemistry. 8-week elective periods.

289 **Inflammation, Immunity, and Hypersensitivity** Affronti and Staff

4-week elective periods.

290 **Extramural Microbiology Elective** (arr.)

The Department arranges for medical students to spend elective periods in other institutions. Interested students should contact the Chairman of the Department.

293 **Special Topics in Microbiology** (arr.) Staff

Selected topics in microbiology. May be repeated for credit. (Fall and spring)

295 **Research in Microbiology** (arr.) Staff

Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Neurological Surgery

Chairman: H.V. Rizzoli

Professors H.V. Rizzoli, J.L. Fox, T.H. Milhorat
Clinical Professors J.M. Williams, H.H. Ammerman, Giovanni Di Chiro, G.J. Hayes, J.M. Van Buren, N.H. Horwitz, C.L. Li, A.K. Ommaya
Professorial Lecturer K.M. Earle
Associate Professor C.B. Early
Associate Clinical Professors J.P. Murphy, A.N. Martins, W.T. Koos, A.P. Hustead
Assistant Professors Emanuele Mannarino, D.R. Smith
Assistant Clinical Professors F.D. Cooney, J.W. Barrett, C.P.H. Carroll
Clinical Instructors R.A. Mendelsohn, Jack Kushner, M.W. Dennis, Mary Hammock, Spiridon Koulouris

Staff
380 **Clinical Neurosurgery**
Clinical clerkship in neurosurgical service. Emphasis on neurologic examination; indications for special neurologic tests, e.g., arteriograms, pneumoencephalograms, etc.; and operative procedures. 4-week elective periods. Univ. Clinic

Martins
381 **Clinical Neurosurgery**
Participation in all departmental activities: ward rounds, daily conferences, radiographic and pathologic studies, operating room procedures; emphasis on studies of cerebral circulation. 4-week elective periods. Walter Reed Gen. Hosp.

Early
382 **Clinical Neurosurgery**
Participation in all departmental activities; ward rounds, daily conferences, radiographic and pathologic studies, operating room procedures. 4-week elective periods. Nat'l. Naval Med. Center

Milhorat
383 **Pediatric Neurosurgery**
Participation in all departmental activities; ward rounds, daily conferences, radiographic and pathologic studies, operating room procedures. 4-week elective periods. Children's Hosp.

Fox
385 **Clinical Neurosurgery**
Clinical clerkship includes experience with diagnostic procedures: arteriograms, pneumoencephalograms, myelograms, and assisting in operating room; conferences and ward rounds. 4-week elective periods. V.A. Hosp.

Horwitz
387 **Clinical Neurosurgery**
Participation in all departmental activities, including ward rounds, daily conferences, radiographic and pathologic studies, and operating room procedures. 4-week elective periods. Wash. Hosp. Center

390 **Extramural Neurosurgery Elective** (arr.)
The Department arranges for students to spend elective periods in other institutions. Interested students should contact the Chairman of the Department.

Neurology

Acting Chairman: Sean O'Reilly
Director of Encephalographic Laboratory: Sean O'Reilly

Professors Harold Stevens, Sean O'Reilly, M.J. Malone, Helen Hess, D.O. Davis
Clinical Professors R.H. Groh, W.K. Engel, G.F. Molinari
Professorial Lecturers K.M. Earle, N.P. Goldstein
Associate Professors Ann Barnet, D.J. Fishman
Associate Clinical Professors A.S. Dekaban, Antonio Stazio, Ntinos Myrianthopoulos, Karin Nelson
Assistant Professors W.H. Lawrence, M.M. Platt, Nirmala Fernbach
Assistant Clinical Professors Virginia Duggins, Cosimo Ajmone Marsan, A.D. Huott, Kristof Abraham, W.J. Hawes, Miryam Davis
Clinical Instructors M.C. Korengold, R.H. Robertson, E.C. Wilner, Howard Silby, David Satinsky, B.H. Natelson, R.N. Edelson, V.J. Blazina

380 **Clinical Neurology** — O'Reilly and Staff

Clinical clerkship in neurology. Emphasis on neurologic examination; indications for special neurologic tests, e.g., arteriograms, pneumoencephalograms, etc.; 4-week elective periods. Univ. Hosp.

382 **Pediatric Neurology** — Malone and Staff

Clinical clerkship in diagnostic study and care of inpatients and outpatients; conferences and teaching sessions. 4-week elective periods. Children's Hosp.

383 **Clinical Neurology** — Buchanan

Emphasis on neurological examination and basic sciences, including neuroanatomy, as applied to clinical material. 4-week elective periods. Walter Reed Gen. Hosp.

386 **Clinical Neurology** — Goldstein

Clinical clerkship under close supervision of highly experienced clinicians and teachers. Trainees prepare histories and conduct physicals, attend rounds and conferences, assist in routine procedures. Abundant clinical material available. 8-week elective periods. Mayo Clinic

390 **Extramural Neurology Elective** (arr.)

A student electing a clerkship at the University Hospital can spend a further elective period in another institution. The student arranges the elective with the other institution and brings the letter of acceptance to the chairman of the Department of Neurology for approval. The student is responsible for reporting his grade to the Department of Neurology, which in turn will submit it to the Associate Dean for Curricular and Student Affairs.

Obstetrics and Gynecology

Chairman: A.B. Weingold

Professors R.H. Barter, J.G. Sites, S.E. Fabro, A.B. Weingold, Roy Hertz *(Research)*, J.G. Maier

Clinical Professors R.A. Chez, W.P. McKelway, M.P. Footer, W.H. Cooper

Associate Professors Benny Waxman, Larry McGowan, J.B. Craft, Jr., Stanley Marinoff

Associate Clinical Professors W.T. Lady, J.W. Pearson, Jr., Shirley Martin, M.S. Kaufman, Donald Walters, J.M. Friedman, B.W. Richwine, Peter Soyster, T.A. Wilson, J.C. Walsh, L.M. Liverett, N.J. Price, H.A. Donald, M.S. Burnhill

Assistant Professors C.B. Jacobson, Michelle Warren, J.C. Srabstein

Assistant Clinical Professors J.R. Epstein, S.H. Shea, H.P. Treichler, I.W. Rovner, M.W. Sandmeyer, Jr., N.M. Tart, R.B. Nelson, Louis Goldstein, George Speck, A.W. Winshel, R.V. Erkenbeck, L.Q. Pugsley, H.L. Kotz, O.I. Dodek, Jr., Julius Fogel, A.I. Robins, S.M. Belinsky, S.F. Stewart, Jr., W.F. Peterson, C.D. Crystle, C.R.A. Gilbert, R.J. Falk, Elizabeth Crisp, G.R. Hewlett, Meyer Rosenbaum, C.E. Townsend, Miriam Cole *(Nurse Midwifery)*

Instructor Bill Bunnag *(Research—Cytology)*

Clinical Instructors A.S. Bright, E.E. Gahres, D.R. Carlson, E.E. Cunningham, Geraldine Paul, Josiah Sacks, R.E. Badwey, E.W. Titus, Jr., T.H. Gresinger, J.M. Close, E.R. Kolvereid, D.M. Margulies, J.C. Skilling, S.D. Cooley, L.E. Fettig, R.W. Smith, W.D. Wallace, Jr., R.M. Regan, B.A. Band, D.H. Martin, W.R. Perkins, L.C. Radice, J.E. Anderson, A.A. de Moya, D.C. Meek, A.A. Becker, C.D. Lord, H.C. Beaver, Carlena Campbell, Melchior Savarese, David Davoudlarian, Marc Fialco, J.B. Credle, S.T. Lee, R.J. Pierce, C.I. Schneiderman, J.E. Alarcon, A.A. Greenfield, Jay Grodin, Mabelle Cremer, T.A. Cook, Jr., M.J. Roberts, N.A. Carr, G.M. Kioko, Rita Rigor, Sharadchandra Shinde, E.G. Koch, Violet Hugh, Anna Van Rooy, F.B. Akerele, J.D. Berryman, J.W. Lyles, J.C. Pan

Special Lecturers R.J. Clark, S.C. Booker, J.H. Niles

Staff

*303 **Clinical Obstetrics and Gynecology**

Participation in all obstetrical and gynecological clinics, daily departmental conferences and ward rounds at University, Fairfax, and Columbia hospitals. Manikin demonstrations of mechanism of labor and various types of operative delivery. (8-week periods throughout academic year)

Jacobson

351 **Introduction to Clinical Practice**

Introduction of first-year medical students to patient situations by members of the clinical staff. Designed to stimulate questions and discussions regarding physical, financial, and moral implications of medical practice. 25 students. Univ. Hosp. (Spring)

---

* Required for medical students.

375 **Clinical Obstetrics and Gynecology and Family Planning** — Weingold, Waxman, McGowan

Participation in office practice of obstetrics and gynecology and family planning clinic. 4-week elective periods. Univ. Clinic

376 **Gynecologic Oncology and Cytopathology** — McGowan

Participation in all aspects of clinical inpatient and office diagnosis and treatment of women with gynecologic cancer; related research. 4-week elective periods. Univ. Clinic

377 **Fetal Monitoring in Labor** — Waxman

Experience in application of fetal monitoring, accumulation and interpretation of data. Participation in intra-partum study of effects on the fetus of labor position, medication, and types of delivery. 4-week elective periods. Univ. Clinic

378 **Endocrinology, Clinical and Laboratory Applications** — Falk

Clinical and laboratory approach to infertility and gynecological endocrinology. 4-week elective periods. Columbia Hosp.

379 **Clinical Obstetrics and Gynecology** — Sites, McKelway, Titus

Participation in office practice of obstetrics and gynecology. 4-week elective periods.

380 **Clinical Obstetrics and Gynecology** — Gahres, Radice

Participation in patient care, clinics, surgery, and delivery. 4-week elective periods. Alexandria Hosp.

381 **Clinical Obstetrics and Gynecology** — Cooper, de Moya

Participation in office practice of obstetrics and gynecology. Introduction to sexual therapy and counseling. 4-week elective periods.

382 **Clinical Obstetrics and Gynecology** — Pugsley, Cooley

Participation in office practice of obstetrics and gynecology. 4-week elective periods.

383 **Clinical Obstetrics and Gynecology** — Footer, Friedman

Participation in office practice of obstetrics and gynecology. 4-week elective periods.

385 **Clinical Gynecology** — Gahres

Case assignments, rounds and conferences, including tumor board, gynecologic pathology, preparation for surgery, attendance at surgery, postoperative care. 4-week elective periods. Wash. Hosp. Center

386 **Clinical Obstetrics and Gynecology** — Treichler, Price, Kolvereid

Participation in office practice of obstetrics and gynecology. 4-week elective periods.

387 **Inpatient Obstetrics and Gynecology** — Patow*

Supervised obstetrics and gynecology in a large military hospital; rounds and conferences. 4-week elective periods. Walter Reed Gen. Hosp.

* Dr. Patow is Chief of the Obstetrics and Gynecology Service at Walter Reed General Hospital.

388 **Clinical Obstetrics and Gynecology** Price

Participation in all aspects of inpatient and outpatient obstetrical and gynecologic services; rounds, obstetrical-gynecologic conferences, gynecologic pathology conferences; emergency room consultations; instruction in obstetrical anesthesia. 4-week elective periods. Fairfax Hosp.

389 **Clinical Obstetrics and Gynecology** Fabro

Participation in patient care, rounds, and conferences. 4-week elective periods. Columbia Hosp.

390 **Extramural Obstetrics and Gynecology Elective** (arr.)

The Department arranges for students to spend elective periods in other institutions. Interested students should contact the Chairman of the Department.

391 **Cytogenetics** (1) Jacobson

Clinical chromosomal anomalies in man, experimental design and data analysis in cytogenetics, two cytogenetics techniques, sex chromatin analysis, tissue culture procedures. Special students admitted with approval of instructor. (Fall 1976 and alternate falls)

392 **Reproductive Genetics** (1) Jacobson

For medical students; open to graduate students with permission of instructor. Lectures with guest speakers, covering current methodology. Emphasis on human infertility; clinical case presentation and review utilized whenever possible. Major topics: gametogenesis, *in vivo* gamete manipulation and fertilization, nidation, and selective factors in development. 15 2nd-year medical students. Univ. Hosp. (Fall)

395 **Gametogenesis** (1) Jacobson

For medical students; open to graduate students with permission of instructor. Seminar course with guest lecturers. Covers various clinical and experimental factors in gametogenesis. Emphasis on histogenesis of the gonads, environmental and clinical variables in infertility. 25 1st-year students. Univ. Hosp. (Spring)

399 **Medical Genetics** (1) Jacobson

Clinical examples of genetic disease. Emphasis on basic principles such as linkage, heterogenity, mutation, and pedigree inheritance. The goal of the course is to provide the knowledge and skills needed to diagnose, manage, and counsel common genetic disorders. (Fall 1976 and alternate falls)

Ophthalmology

Chairman: M.F. Armaly

Professors M.F. Armaly, Dean Krueger *(Research)*
Clinical Professors J.H. King, Jr., M.M. Parks, M.G. Alper, L.E. Zimmerman
Associate Professors B.S. Fine *(Research)*, M.O. T'so *(Research)*, D.S. Friendly
Associate Clinical Professor L.M. King, Jr.
Assistant Professors Dertad Manguikian, Jean Swartz *(Research)*, R.N. Sunga, Hanna Zakharia, M.D. Olson, Mary McCrea *(Research)*

Assistant Clinical Professors W.J. Romejko, W.P. Chalfant, Jr., R.E. duPrey, Robert Day, J.H. Lodge, W.B. Glew, K.A. Simon, H.A. Urweider, B.H. Zeavin, H.N. Bernstein, D.K. Berler, J.N. Goldman, A.L. Fjordbotten, W.S. Gilbert, H.S. Wicker, D.G. Albert, S.P. Ginsberg, M.H. Zimmerman, F.G. La Piana, Frederick Reeser, G.D. Rogell, J.F. O'Neill, D.E. Schwartz, P.T. Gavaris

Clinical Instructors S.S. Pappas, R.S. Deitch, H.I. Rodman, George Liss, H.M. McAllister, L.E. Perraut, H.J. Starr, Leonard Kogan, J.F. Nowell, Bernard Ehrlich, D.L. Lanter, Richard Huberman, P.A. Dorn, Jr., E.M. Zimmerman, Joseph Snyder, B.S. Bruner, M.E. Lederman, L.E. Rothkoff, M.D. Krinn, Thomas Frey, D.M. Wanicur, W.S.N. Ibrahim, Evadne Titer, D.T. Casey, Samuel Stoleru

281 **Ophthalmic Pathology I** — **L. Zimmerman**

Basic science aspects of diseases of the eye. (Spring)

282 **Ophthalmic Pathology II** — **L. Zimmerman**

Diseases of the eye as revealed by gross and microscopic examination. 8 students. Armed Forces Inst. of Path. (Spring)

284 **Ophthalmic Pathology III** — **L. Zimmerman**

Daily participation in an active service limited to pathology of the eye and its adnexa. Inflammatory, degenerative, and neoplastic diseases comprise the major categories. 4-week elective periods. Armed Forces Inst. of Path.

380 **Clinical Ophthalmology** — **Lodge**

Students will observe all types of eye conditions in ambulatory and hospitalized patients. 4-week elective periods. Wash. Hosp. Center

381 **Clinical Ophthalmology** — **Armaly and Staff**

Introduction to clinical ophthalmology, demonstration of the methodology involved in eye examination, detection of normal and abnormal findings, and participation in outpatient and inpatient medical and surgical care. Lectures, seminars. 4-week elective periods. Univ. Clinic

390 **Extramural Ophthalmology Elective** (arr.)

The Department arranges for students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

Orthopaedic Surgery

Chairman: J.P. Adams
Associate Chairman: H.L. Feffer

Professors J.P. Adams, H.L. Feffer, Fred Leonard *(Research)*, D.W. McKay, R.S. Snell, P.I. Kenmore, D.Q. Wilson
Clinical Professors J.S. Neviaser, L.T. Peterson, Charles Keck
Associate Professors R.J. Neviaser, W.P. Fortune

Associate Clinical Professors R.L. Dow, Byron Genner III
Assistant Professors H.O. Goller *(Research)*, P.A. Moskovitz, S.S. Nason, Diane Brickley *(Research)*
Assistant Clinical Professors G.J. Schonholtz, G.I. Baker, S.H. Eisenberg, G.P. Bogumill, K.A. Peterson, L.A. Ottenritter, H.S. Cattell, B.P. Vitek, C.W. McCutchen *(Biomechanics)*, A.I. Dobranski, Stanford Lavine, M.A. Schultz, Ulla Fortune, L.J. Micheli, S.S. Haas, W.H. Browning, S.F. Gunther
Clinical Instructors Ronald Ottenberg, Richard Conant, J.W. Harvey, R.M. Ackerman, R.J. Heilen, C.C. Liu, F.R.T. Nelson, T.J. Neviaser, R.L. Gaertner, Robert Loeffler, C.C. MacCartee, J.W. Witte, H.N. Mininberg

*302 **Clinical Clerkship in Orthopaedic Surgery**
2 weeks at the Univ. Hosp.

380 **Orthopaedic Surgery** — Adams and Staff
Rotating program: one week of adult orthopaedics at University Hospital; one week of children's orthopaedics at Children's Hospital; one week of general orthopaedics at Walter Reed General Hospital, Andrews Air Force Base Hospital, or National Naval Medical Center. 4-week elective periods.

381 **Orthopaedic Surgery** — Kenmore
Participation in total care program of orthopaedic patients: daily rounds, conferences, seminars. 4-week elective periods. V.A. Hosp.

382 **Research in Orthopaedic Surgery** (arr.) — Leonard, Adams

383 **Sports Medicine** (arr.) — Haas, Lavine
Introduction to athletic injuries, including prevention and management. Interested students should contact Dr. Haas.

390 **Extramural Orthopaedic Surgery** (arr.)
The Department arranges for students to spend elective periods in other institutions. Interested students should contact the Chairman of the Department.

395 **Research in Orthopaedic Surgery** — Leonard
4-, 8-, 12-, or 16-week elective periods. Univ. Hosp.

Otolaryngology

Chairman: J.J. McFarland, Jr.

Associate Clinical Professors J.J. McFarland, Jr., Max Fischer, D.N.F. Fairbanks
Assistant Clinical Professors J.L. Levine, M.E. Krucoff, R.S. Page, Jr., J.A. Sabri, W.M. Trible, B.M. Webb, R.E. Pumphrey, Jr., Stephen Epstein

* Required for medical students. Credit is a part of and is assigned after completion of Surg 301

Clinical Instructors I.S. Jaffee, R.D. Ralph, H.H.E. Scheidemandel, G.F. Miller, Jr., R.J. Bobys, Daniel Isaacson, B.A. Feldman, H.C. Stein, N.L. Barr, Jr., Barry Modlin, Allen Small

380 **Otolaryngology** McFarland

Care of inpatients and outpatients, diagnosis, and therapy; rounds and conferences. 4- or 12-week elective periods. Wash. Hosp. Center

390 **Extramural Otolaryngology Elective** (arr.)

The Department arranges for students to spend elective periods in other institutions. Interested students should contact the Chairman of the Department.

395 **Clinical Clerkship** deFries and Staff

Experience includes inpatient and outpatient rotations together with operating room experience. 4-week elective periods. Nat'l. Naval Med. Center

Pathology

Acting Chairman: F.N. Miller, Jr.

Professors F.N. Miller, Jr., William Newman, B.H. Smith, Mary Matthews, Mario Werner *(Laboratory Medicine)*, M.J. Valaske, Alexander Breslow, L.S. Lessin

Clinical Professors L.E. Zimmerman *(Ophthalmic)*, J.M. Blumberg, E.B. Helwig *(Dermatologic)*, N.S. Irey, Robert Sauer *(Comparative)*, Cornelia Hoch-Ligeti, J.L. Luke *(Forensic)*, C.F. Bishop *(Laboratory Medicine)*, R.S. Melville *(Laboratory Medicine)*, R.A. Malmgren

Professorial Lecturers P.D. Olch *(History of Medicine)*, Tatiana Antonovych

Associate Professors W.L. Marsh, F.S. Jannotta, W.A. Burns, R.B. Lingeman, Nirmal Saini, M.F. Dolan *(Hematology)*, D.S. O'Leary *(Laboratory Medicine)*, S.G. Kent, B.C. Zook *(Comparative)*, Yousef Al-Doory, Grace Guin

Associate Clinical Professors V.E. Martens, R.E. Palmer, W.J. Jaffurs, C.B. Cook, H.A. Schwamm, A.D. Cramer *(Blood Banking)*, F.B. Johnson, H.J. Norris

Assistant Professors Suzanne Hammersberg *(Medical Technology)*, J.G. Guccion, Jocelyn Hicks, F.P. Abramson *(Research)*, Patsy Robinson *(Microbiology)*, M.H. Fusillo *(Laboratory Medicine)*, J.A. Zeller *(Laboratory Medicine)*, E.W. Sutherland III

Assistant Clinical Professors W.F. Enos, Marjorie Williams, D.R. Parkinson, I.D. Godwin, F.M. Garner *(Comparative)*, Gloria Brennan, J.W. Howell *(Clinical Chemistry)*, B.D. Blackbourne *(Forensic)*, M.B. Furlong, Jr. *(Laboratory Medicine)*, B.J. Pearson *(Laboratory Medicine)*, H.H. Berman, LeRoy Riddick, K.B. Barr *(Laboratory Medicine)*, D.J. Kelly, G.W. Kindschi, R.E Nensel, H.J. Zirkin

Clinical Instructors D.C. Hendrix *(Allied Health Science)*, C.R. Lissner *(Clinical Microbiology)*, M.L. Pratt *(Blood Banking)*, Milo Prodanovich *(Clinical Chemistry)*, H.A. Shulman *(Laboratory Medicine)*, Linda Christoffersen *(Lab-*

oratory Medicine), R.D. Hughes, Ann Baryshyan *(Laboratory Medicine)*, Marianne Bayley *(Laboratory Medicine)*, Carol Czerwinski *(Laboratory Medicine)*, Herenia Osma *(Laboratory Medicine)*, Susan Engel *(Laboratory Medicine)*, J.W. Filleman *(Laboratory Medicine)*, Edith Godette *(Laboratory Medicine)*, R.G. Hansen *(Laboratory Medicine)*, Janet Higgins *(Laboratory Medicine)*, D.M. Klym *(Laboratory Medicine)*, Melba Ksiazek *(Laboratory Medicine)*, Sheldon Levin *(Laboratory Medicine)*, D.J. Marsick *(Laboratory Medicine)*, C.R. Martin *(Laboratory Medicine)*, D.G. Martin *(Laboratory Medicine)*, M.F. Pratt *(Laboratory Medicine)*, Cheryl Roock *(Laboratory Medicine)*, Barbara Sinha *(Laboratory Medicine)*, H.T. Trettel *(Laboratory Medicine)*, R.J. Walsh *(Laboratory Medicine)*, Barbara Zimmerman *(Laboratory Medicine)*, R.M. Anglin, R.C. Schoening, R.C.E. Scott, K.T. Smith, Ernest Bollin, Jr., J.R. Crabbe, B.R. Hinton, A.W. Green, J.C. La Porte, J.A. Maples, D.C. Nitsche, G.L. Roecker, S.W. Theune, Lena Turner, Ching-Te Wang, K.M. Doetsch, Lynne Potempa, T.R. Roy, V.O. Strubeck, Jr.

Special Lecturers L.C. Johnson, R.S. Chandra, D.E. Blessing, E.C. Cager, T.D. Carpenter, C.C. Conboy, P.T. Geueke, E.E. Hogg, Celesta Miller, R.L. Peckham, J.H. Rollen, R.L. Santos, W.S. Slimak, Frederick Wright, S.M. Garman

Staff

11 Clinical Chemistry (9)

Open to students in the off-campus program leading to the degree of Associate in Science with a concentration in Medical Laboratory Technique. Blood chemistry: principles and techniques of analysis; toxicology, emphasizing drugs of abuse and environmental poisons; urinalysis; quality control in clinical chemistry. Prerequisite: Chem 9 or 11 or equivalent.

Staff

12 Clinical Microbiology (12)

Open to students in the off-campus program leading to the degree of Associate in Science with a concentration in Medical Laboratory Technique. General bacteriology, with emphasis on identification of pathologic micro-organisms by morphologic and cultural methods; immunology and serology stressing basic principles and techniques used in diagnostic studies; parasitology, especially identification of parasites and insects that may affect man; quality control in clinical microbiology.

Staff

13 Hematology (6)

Open to students in the off-campus program leading to the degree of Associate in Science with a concentration in Medical Laboratory Technique. Basic hematologic procedures, diagnosis of abnormalities of cellular elements of blood and bone marrow, studies in blood coagulation, quality control in clinical hematology.

Staff

14 Blood Banking (6)

Open to students in the off-campus program leading to the degree of Associate in Science with a concentration in Medical Laboratory Technique. Principles of immunohematology, blood donor center techniques, blood processing techniques, quality control in blood banking.

Staff

15 Clinical Laboratory Rotation (12)

Open to students in the off-campus program leading to the degree of Associate in Science with a concentration in Medical Laboratory Technique. Instructions in laboratory technique, stressing the application of theories and principles of clinical chemistry, clinical microbiology, hematology, and blood banking in the day-to-day operations of the modern clinical laboratory.

115–16 **Introduction to Medical Science** (1–1) Marsh, Hammersberg, and Staff

Open to candidates for the degree of Bachelor of Science in Medical Technology. Lectures on physiology, pathology, and medicine to accompany Path 117–18. (Academic year)

117–18 **Principles in Medical Technology** (4–4) Marsh, Hammersberg, and Staff

Open to candidates for the degree of Bachelor of Science in Medical Technology. Theories, principles, sources of error of methods used in clinical chemistry, clinical bacteriology, serology, hematology, clinical microscopy. (Academic year)

119–20 **Medical Technology Laboratory** (10–10) Marsh, Hammersberg, and Staff

Open to candidates for the degree of Bachelor of Science in Medical Technology. Rotation through University Hospital pathology laboratories: hematology and urinalysis, 12 weeks; chemistry, 16 weeks; bacteriology and parasitology, 12 weeks; blood bank, 6 weeks; serology, 4 weeks. (35 hours a week for 50 weeks)

129 **Pathology for New Health Practitioners** (2) Miller

(This course is one-third of former Med 128 Mechanisms of Diseases [6])

Lecture course with optional laboratory. Basic pathologic concepts and infectious diseases; languages of pathology; fundamental disease processes. Emphasis on pathogenesis and dynamics of disease. Causation, evolution, and morphology of pathologic changes in the principal diseases of each organ system presented in coordination with clinical lectures in *Idis 301*. (Fall and spring)

*201 **Pathology** (8) Staff

A year course; required for 2nd-year medical students. General introduction to concepts of disease. Pathology of organ systems; correlation with symptoms and physical signs. Gross and microscopic study of diseased tissues. Case studies.

202 **Diagnostic Conferences** (1) Jannotta, Gusack

Case studies demonstrating pathologic significance of major clinical symptoms and physical signs. (Spring—1 hour a week)

203–4 **Pathology** (4–4) Staff

For graduate students. General introduction to concepts of disease. Pathology of organ systems; correlation with symptoms and physical signs. Gross and microscopic study of diseased tissues. Case studies. Limited enrollment. Prerequisite to Path 204: Path 203. (Academic year)

†205 **Comparative Pathology I** (3) Zook

An introduction to the study of disease in vertebrates, comparison with disease in man. Mechanisms by which various agents provoke illness; body defensive reactions. Illustration of common diseases of various species, including material from captive wild animals. Recommended: courses in anatomy, histology, and physiology. (Fall)

* An interdepartmental course offered by the departments of Pathology and Biological Sciences.
† Open to limited number of graduate students, with permission.

*210 **Comparative Pathology Laboratory** (2) Zook

Special assignments for dissection and study, including study of common diseases of captive wild animals. Path. Lab., Nat'l. Zoological Park (Fall—6 hours a week)

212 **Pulmonary Pathology** (1) Guccion

Basic disease processes reviewed and expanded upon. Lectures, case presentations, and group discussions, with correlation of clinical, radiological, and pathological changes. V.A. Hosp. (Spring—2 hours a week for 8 weeks)

214 **Diseases of the Liver** (1) Burns

The most important liver diseases, using the liver biopsy as the focal point. Clinical summary and microscopic findings, including electron microscopy where useful. V.A. Hosp. (Spring—2 hours a week for 8 weeks)

*215 **Perinatal Pathology Laboratory** (2) Kent

Special assignments for dissection and study. Univ. Hosp. (Fall—6 hours a week)

216 **Necropsy Pathology** (2) Saini

Review of current necropsy cases stressing interpretation of clinical symptoms and signs and radiographs on the basis of gross changes in the organs. V.A. Hosp. (Spring—2 hours a week)

252 **Forensic Pathology and Medical Jurisprudence** (1) Miller

Somatic death, coroner and medical examiner systems, pathology of physical and chemical injuries, medical licensure; the physician-patient relationship and professional liability are discussed. (Spring—1 hour a week)

253 **Medicine in Shakespeare** (1) Miller

Seminars with student and staff presentations covering the plays of William Shakespeare of medical significance. (Spring—1 hour a week)

254 **Medicine in Literature** (1) Miller

Series of discussions with student and staff presentations covering novels, dramas, nonfiction, and poetry of medical significance. (Fall—1 hour a week)

260 **Obstetric and Gynecologic Pathology** (1) Jaffurs

Organ changes in normal and abnormal pregnancy, including both the mother and the fetus. Diseases of female genital system. (Spring—1 hour a week)

*266 **Comparative Pathology II** (1) Zook

Participation in an autopsy service involving wild animals in captivity and comparison of diseases in various animal species with those in man. Limited to 4 students. Path. Lab., Nat'l. Zoological Park (Spring—four 3-hour sessions)

*271 **Tissue Reactions to Drugs** (1) Irey

Study of the problems involved in recognizing instances of untoward reaction to therapy. Case presentations. (Spring—1 hour a week)

---

* Open to limited number of graduate students, with permission.

*277 **Anatomic Pathology Clerkship I** (arr.) **Staff**

A practical course in gross human anatomy and pathology. Prerequisite: Anat 201 or equivalent. Students spend up to 24 weeks full-time on the necropsy and surgical pathology services, receiving 1 semester hour of credit for each 4-week period. Univ. and V.A. Hosps.

279 **Ophthalmic Pathology I** (2) **Zimmerman**

(Formerly one credit)

Basic science aspects of diseases of the eye. (Spring—2 hours a week)

280 **Surgical Pathology I** (4) Newman, Matthews, Palmer, Schwamm

Surgical pathology service at participating hospitals. Examining specimens from current surgical cases, correlating with clinical manifestations. Univ., V.A., Alexandria, and Andrews AFB hosps. (Spring—6 hours a week)

*281 **Anatomic Pathology Clerkship II** (arr.) **Staff**

A practical course in gross and microscopic human pathology. Prerequisite: Path 201 or equivalent. Students spend up to 24 weeks full-time, or the equivalent part-time, on the necropsy and surgical pathology services, receiving 1 semester hour of credit for each 4-week full-time period. Univ. and V.A. hosps. (Spring)

282 **Ophthalmic Pathology II** (2) **Zimmerman**

(Formerly three credits)

Diseases of the eye as revealed by gross and microscopic examination. Concurrent registration for Path 279 required. 6 students. Armed Forces Inst. of Path. (Spring—3 hours a week)

*283 **Anatomic Pathology Clerkship III** (arr.) **Staff**

Necropsy and surgical pathology service. Prerequisite: Path 201 or 203–4. Graduate students receive 5 semester hours of credit for each 4-week period and may receive up to 30 semester hours of credit for 6 months full time. Medical students receive 5 semester hours of credit for each 4-week elective period. (Medical students: 4- or 8-week elective periods. Graduate students: fall or spring)

284 **Ophthalmic Pathology III** (5) **Zimmerman**

Daily participation in service limited to pathology of the eye and its adnexa. 4-week elective periods. Armed Forces Inst. of Path.

285 **Clinical Pathology** (5) **Martens**

Selected techniques of clinical chemistry, hematology, bacteriology. Student selects laboratory problem. 4-week elective period. Wash. Hosp. Center

286 **Perinatal Pathology** (5) **Kent**

Participation in perinatal (fetal and newborn) necropsies. Study of selected teaching cases. Examination of selected placentas for disease. 4-week elective periods. Univ. Hosp.

287 **Immunohematology and Blood Banking** (5) **Marsh**

Preparation and use of blood and blood products in surgery and in blood diseases, studied from the laboratory as well as the clinical viewpoint. Emphasis on management of acute clinical situation. 4-week elective periods. Univ. Hosp.

* Open to limited number of graduate students, with permission.

288 **Clinical Pharmacology and Toxicology** (5) Abramson

Correlations of therapeutic drug levels in hospitalized patients and outpatients with their clinical status. Evaluation of rational dosage schedules. Development and application of clinical laboratory methods for determination of drug levels. 4-week elective periods.

289 **Clinical and Anatomical Pathology** (5) Cook

Daily studies of surgical and necropsy pathology, including forensic pathology; clinical pathology projects, including hematology, isotopology, bacteriology. 4-week elective periods. Fairfax Hosp.

290 **Extramural Pathology Elective** (arr.)

The Department arranges for medical students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

291 **Clinical and/or Anatomical Pathology** (5) B. Smith

Students will have an opportunity to explore in depth a topic of interest to them in the field of pathology; library study. 4-week elective periods. V.A. Hosp.

293 **Clinical and Anatomical Pathology** (5) Palmer

Participation in departmental activities, including clinical chemistry, blood bank, microbiology, and hematology; surgical pathology; autopsy pathology, including medico-legal autopsies. 4-week elective periods. Alexandria Hosp.

294 **Forensic Pathology** (5) Luke

Participation in the activities of the Office of the Chief Medical Examiner of the District of Columbia: observation of scene investigation, participation in medico-legal autopsies, attendance at court trials, etc. 4-week elective periods. Office of the Chief Medical Examiner

*295 **Comparative Pathology III** (arr.) Zook

Participation in veterinary pathology service, including wild and domestic animals. Prerequisite: Path 201 or 203–4, and 283. Graduate students receive 5 semester hours of credit for each 4-week period and may receive up to 30 semester hours of credit for 6 months full time. Medical students receive 5 semester hours of credit for each 4-week elective period. (Medical students: 4-week elective periods. Path. Lab., Nat'l. Zoological Park, and Armed Forces Inst. of Path. Graduate students: fall or spring)

296 **Surgical Pathology II** (5) Newman

Evaluation of surgical specimens and correlation with clinical status of patient, description of gross and microscopic findings on assigned cases. 4-week elective periods. Univ. Hosp.

297 **Dermal Pathology** (5) Helwig

Microscopic conferences, review of current material and study sets. 4-week elective periods. Armed Forces Inst. of Path.

298 **Necropsy Pathology** (5) Staff

Organ changes in disease, gross and microscopic examinations, preparation of protocols. 4-week elective periods. Univ. Hosp.

* Open to limited number of graduate students, with permission.

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Pharmacology

Chairman: H.G. Mandel

Professors H.G. Mandel, V.H. Cohn, Jr., Paul Mazel, E.B. Truitt, Jr. *(Research)*, Roy Hertz *(Research)*
Professorial Lecturers F.E. Hahn, Julius Axelrod, Erminio Costa
Associate Professors J.A. Straw, Philip Klubes
Assistant Professors G.S. Edwards, F.P. Abramson *(Research)*, H.C. Harder, J.W. Dailey, E.W. Sutherland III, Dominique Pessayre *(Research)*, Mohammad Shahvari
Special Lecturer P.J. Creaven

21–22 **Chemistry and Physics of Anesthesia** (3–3) Mazel and Staff
For students in Nurse Anesthetist programs. Fundamental concepts of physics; general chemistry, organic chemistry, and biochemistry and their application to medicine and anesthesiology, including chemistry of respiration, acid-base balance, clinical biochemistry and enzymology, hormones, radioisotopes, electronics, physicochemical properties of anesthetic agents, and other related topics. (Academic year)

110 **Pharmacological Basis of Anesthesia** (3) Mazel and Staff
For students in Nurse Anesthetist programs. Fundamental principles of pharmacology; drugs affecting the autonomic nervous system, central nervous system, and cardiovascular system; fundamentals of inhalation anesthesia; auxiliary drugs used in anesthesiology; other topics. (Spring)

115 **Drug Abuse Education** (3) Cohn and Staff
Psychological and sociological bases of drug abuse, pharmacological and toxicological aspects of drug action on both the brain and peripheral organ systems, legal and societal implications of and reactions to drug abuse. Lectures and discussions on alcohol, narcotics, central nervous system stimulants and depressants, marijuana, hallucinogenic and psychedelic drugs. (Fall and spring)

120 **Readings in Pharmacology for Anesthesia** (arr.) Mazel and Staff
For students in Nurse Anesthestist programs. Assigned reading in anesthesia and related areas; preparation of reports.

130 **Seminar: Accessory Drugs in Anesthesia** (2) Mazel and Staff

For students in Nurse Anesthetist programs. Presentation of the pharmacology and pharmacodynamics of accessory anesthetic drugs; emphasis on those areas not covered in Phar 110.

158 **Pharmacology for New Health Practitioners** (2) Staff

(This course is one-third of former Med 128 Mechanisms of Disease [6]) Lecture course. Basic concepts in pharmacology. Topics include chemical structure of pharmacologic preparations, drug interactions and synergism, toxocity, and dosage. (Spring)

201 **Pharmacology** Mandel and Staff

A year course; required for 2nd-year medical students. Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis for rational therapy of disease. Prerequisite: Bioc 201, Phys 201.

203 **Fundamental Principles of Pharmacology** Cohn and Staff

Basic principles of pharmacology, including drug-receptor interactions, structure activity relationships, pharmacokinetics, membrane phenomena, cellular control mechanisms, drug toxicity. (Fall)

205–6 **Pharmacology** (4–4) Klubes and Staff

For graduate students. Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis for rational therapy of disease. Prerequisite to Phar 205: Bioc 221–22, Phys 201, or approval of Department. Prerequisite to Phar 206: Phar 205. (Academic year)

215 **Adolescent Drug Abuse** (3 or 4) Cohn and Staff

Not open to medical students. Offered off campus through the College of General Studies. Primarily for teachers, counselors, and school administrators. Multidisciplinary lectures and discussions concerning the physiological and psychological effects of narcotics, central nervous system stimulants and depressants, alcohol, marijuana, hallucinogenic and psychedelic drugs; psychosocial factors leading to adolescent drug abuse; legal implications of drug abuse; prevention, control, and treatment of drug abuse. (Fall and spring)

216 **Drug Abuse Education Techniques** (3) Cohn and Staff

Not open to medical students. Offered off campus through the College of General Studies. Primarily for teachers and counselors preparing to direct drug abuse education programs. Intensive review of current information on drug abuse, dynamics of group process, supervised practical experience. Prerequisite: Phar 215 and permission of instructor.

225 **Treatment of Narcotic Dependence** (arr.) Cohn

Students work on a one-to-one basis with a physician/psychiatrist in the treatment of drug dependence at the Narcotic Treatment Administration, the V.A. Hospital, or the Psychiatric Institute of Washington, D.C.

252 **Seminar: Clinical Pharmacology** (2) Staff

Principles of experimental design for the evaluation of drug efficacy and safety in man. Problems in therapeutics; emphasis on drugs used in treatment of cardiovascular and infectious diseases. Enrollment limited. (Spring 1976 and alternate springs)

254 **Frontiers in Pharmacology** (1) Mazel and Staff

For medical and graduate students. Recent advances and fields of research in pharmacology. Presentations by laboratory scientists from neighboring institutions. (Spring)

256 **Molecular Pharmacology** (2) Hahn

For medical and graduate students. Current theory on action of drugs, especially chemotherapeutic agents, at molecular level. Effect of drugs on biosynthetic processes of the cell with respect to DNA, messenger RNA, transfer RNA, ribosomes, protein, cell wall, and intermediary metabolites. Factors which alter action of drugs, such as drug interactions and resistance. (Spring)

258 **Cancer Chemotherapy** (1) Mandel and Staff

For medical and graduate students. Mechanisms by which drugs inhibit the growth of tumor cells. (Spring 1976 and alternate springs)

259 **Developmental Pharmacology** (1) Staff

For medical and graduate students. Lectures, seminars, conferences. Teratogenic actions of drugs; pharmacological principles which apply during prenatal and perinatal development. (Spring 1976 and alternate springs)

260 **Endocrine Pharmacology** (1) Hertz and Staff

For medical and graduate students. Lectures and seminars on recent advances in the pharmacology and mechanism of action of various hormones. (Spring 1977 and alternate springs)

267 **Pharmacological Research** (arr.) Staff

For graduate students. Research with staff members. May be repeated once for credit toward a Master of Science degree. (Fall and spring)

269 **Pharmacology Seminar** (1) Mazel and Staff

For graduate students. Recent advances in pharmacology. Content differs each time the course is offered; may be repeated once for credit. (Fall and spring)

272 **Physiological Disposition of Drugs** (3) Cohn

For medical and graduate students. Fate of drugs in biological tissue. Absorption, distribution, chemical alteration, excretion of drugs; physical, chemical, and biological factors affecting these processes. Prerequisite: Phar 201 or 205–6. (Spring 1976 and alternate springs)

275–76 **Advanced Topics in Pharmacology I–II** (1–1) Klubes and Staff

Lectures and seminars on advances in mechanisms of drug action, pharmacology of new drugs, theoretical aspects of pharmacology, laboratory techniques. (Academic year 1975–76 and alternate years)

277–78 **Advanced Topics in Pharmacology III–IV** (1–1) Klubes and Staff

Continuation of Phar 275–76. (Academic year 1976–77 and alternate years)

279 **Special Topics in Pharmacology** (arr.) Costa, Hertz

Selected aspects of drug action. Content differs each time the course is offered; may be repeated once for credit. (Fall and spring)

281 **Physiological Techniques in Pharmacology—Lecture** (2) — Mazel, Straw

For medical and graduate students. Physiological techniques for obtaining information on mechanism and site of action of pharmacological agents. Phar 281 may be taken without 282. Prerequisite: Phar 201 or 205–6. (Spring 1976 and alternate springs)

282 **Physiological Techniques in Pharmacology—Laboratory** (2) — Mazel, Straw

Accompanies Phar 281. Prerequisite: Phar 201 or 205–6. Prerequisite or concurrent registration: Phar 281. (Spring 1976 and alternate springs)

283 **Biochemical Techniques in Pharmacology** (arr.) — Edwards, Cohn

For graduate students. Lecture and laboratory. Theory and practice of modern biochemical techniques applicable to study of metabolic fate and mechanism of action of drugs. Prerequisite: Phar 205–6. (Summer)

285 **Readings in Pharmacology** — Mazel

For medical students. Assigned reading and preparation of report. (Fall and spring)

286 **Research in Pharmacology** (arr.) — Staff

For medical students. Participation in experimental studies in pharmacology, particularly endocrinology, cancer chemotherapy, or drug metabolism (Fall and spring)

287 **Readings in Drug Abuse Literature** — Cohn, Klubes

Both professional and nonprofessional literature in the general area of drug dependence. Informal monthly luncheon discussions. (Spring)

295 **Reading and Research** (arr.) — Staff

Independent study for students preparing for the Master of Science degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) — Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) — Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) — Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Physiology

Chairman: R.A. Kenney

Professors C.S. Tidball, R.A. Kenney, Elizabeth Tidball, Marie Cassidy
Professorial Lecturer D.O. Carpenter
Associate Professors M.J. Jackson, Michael McCally

Assistant Professors R.A. Lavine, D.W. Watkins, Mary McCrea *(Research)*
Assistant Professorial Lecturers I.P. Weiss, E.A. Steane
Special Lecturer L.L. Langley

Departmental prerequisite: Phyl 201 or equivalent is prerequisite to all courses in Physiology numbered above 201.

115 **Physiology for Nurse Anesthetists** (3) — Staff

For students in Nurse Anesthetist programs. Emphasis on respiratory, cardiovascular, and autonomic nervous system physiology; a more general survey of other systems.

191 **Selected Topics in Human Structure and Function** (3) — Kenney

Lecture (2 hours), laboratory (1 hour). Structural and functional basis of physiology. A required course for graduate students who have not had Anat 201 or equivalent. An undergraduate course; students may receive graduate credit on completion of additional work as prescribed by the instructor. Prerequisite: BiSc 11–12 or equivalent and consent of instructor. Open to Columbian College of Arts and Sciences students with the approval of the student's major adviser. (Fall)

*201 **Physiology** (8) — Staff

Lecture (8 hours), laboratory (2 hours), conference (1 hour). Cellular, organ system, and applied mammalian physiology. Prerequisite for graduate students: Anat 201 or Phyl 191, or equivalent; Bioc 201 or 221–22 (Bioc 222 may be taken concurrently); or consent of Chairman of Department. Open to Consortium students only with permission of Department Chairman. (Spring)

211 **Cell Biology** (2) — Staff

For graduate students. Same as Anat 211 and Idis 211. An integrated survey of the structure, function, and metabolism of the cell, as an introduction to the medical sciences.

212 **Neurobiology** (3) — Staff

For graduate students. Same as Anat 212 and Idis 212. An integrated survey of the structure and function of the human nervous system; lecture, clinical demonstration, and laboratory. Laboratory fee, $25.

221 **Seminar** (1) — Cassidy

Staff and student presentations from literature. Present work discussed, experimental design and scientific deduction evaluated. Topics to be announced. Prerequisite: a reading knowledge of French or German. Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

251 **History of Medicine** (1) — E. Tidball

Survey of the great contributors to physiology and medicine in the context of the times in which they lived and worked. (Fall)

252 **Physiological Basis of Sexuality** (2) — C. Tidball, E. Tidball

Conference and discussion on topics including communication, psychosexual development, physiological responses, homosexuality, population control and family planning, fertility and sterility, and other topics of interest to the class. (Fall)

*Required for medical students, open to graduate students.

253 **Physiology of Fluid Balance and Hydrogen Ion Regulation** (2) — Cassidy

Discussion on principles of fluid and acid-base balance and the application of these principles to specific situations. (Fall)

261 **Gastrointestinal Physiology** (1 or 2) — Jackson, Dobbins

Weekly seminar; role of basic sciences in gastroenterology; intra- and extra-mural speakers. An approved paper required for 2 semester hours of credit. May be repeated for credit. (Fall and spring)

262 **Topics in Cardiovascular Physiology** (2) — Kenney

Survey, at an advanced level, of aspects of cardiovascular physiology especially as interrelated with the respiratory and renal systems. (Fall)

265 **Review of Endocrinology** (1) — Jackson

Review of basic endocrinology. (Fall)

266 **Advanced Endocrinology** (2) — Jackson

Review at advanced level of selected topics in endocrinology and metabolism. Concurrent registration in Phyl 265 required. (Fall)

267 **Renal Physiology** (2) — Kenney

Lecture or conference 2 hours a week. Overview of renal physiology at advanced level.

268 **Computer Utilization in Physiology and Medicine** (2) — C. Tidball

Lecture 1 hour a week, practical experience at student's convenience. Orientation to digital and analog mini-computers. Programming in several languages. Experience with one or more computers. No previous computer experience necessary. (Fall)

269 **Topics in Neurophysiology and Psychophysiology** (2) — Lavine

Selected topics in contemporary neurophysiology, including methods of data collection and analysis, control mechanisms involved in movement and behavior and sensory processing. Open to students in the School of Engineering and Applied Science with permission of instructor. (Fall)

282 **Experimental Physiology** (5) — Staff

Participation in an ongoing research program in the Department. Programs are currently available in the areas of membrane physiology, intestinal transport, neurophysiology, and cardiovascular physiology. 4-week elective periods.

284 **Advanced Physiology** (5) — Staff

Guided study and/or laboratory experience at an advanced level in a subfield of physiology. Prior arrangements should be made with the individual faculty member. 4-week elective periods.

290 **Extramural Physiology Elective** (arr.)

The Department arranges for medical students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

295 **Research** (arr.) — Staff

By special arrangement with individual Staff members. Approximately 4 clock hours in the laboratory for each semester hour of credit. Content

differs each time course is offered; may be repeated for credit. (Fall and spring)

298 **Comprehensive Physiology** (arr.) Staff

Guided review of selected areas of Physiology appropriate to the student's graduate program. This course satisfies the requirements for the Master's Comprehensive Examination, the Field Examination for doctoral students minoring in Physiology, and Part I of the Cumulative General Examination. Prerequisite or concurrent registration: Phyl 221. (Fall)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

396 **Advanced Reading and Research** (2) Staff

Limited to students preparing for the Doctor of Philosophy general examination. Tutorial literature survey of a subfield of Physiology and of pertinent areas of the candidate's minor field. This course satisfies the requirement for Part II of the Cumulative General Examination in Physiology. (Fall and spring)

397 **Development of Dissertation Problem** (2) Staff

Limited to students preparing for the Doctor of Philosophy general examination. Preparation for written and oral presentation of dissertation problem. This course satisfies the requirement for Part III of the Cumulative General Examination in Physiology. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Psychiatry and Behavioral Sciences

Chairman: T.G. Webster

Professors Leon Yochelson, J.E. Rankin, T.G. Webster, E.A. Hargrove, R.L. Shapiro, Rebecca Rieger *(Research)*, David Reiss

Clinical Professors D.C. Cameron, T.D. Noble, Sidney Berman, Morris Kleinerman, M.deG. Ruffin, Norman Taub, Samuel Yochelson *(Criminal Behavior)*, D.L. Bazelon *(Socio-legal Aspects)*, Leon Ferber, Paul Gray, Paul Chodoff, H.A. Meyersburg, F.N. Waldrop, Stanley Yolles, Harold Weiner *(Experimental Psychology)*, Harvey Resnik, Leopold Bellak, J.D. Noshpitz, William Stark, Bertram Brown, H.H. Work, Hilliard Jason, Leon Cytryn, E.I. Kushner, John Kafka, Milton Meltzer, Jeanne Spurlock, Martin Katz, C.T. Bever, S.L. Baker, Jr., Seymour Perlin

Professorial Lecturer H.D. Lederer

Associate Professors G.E. Morris *(Allied Health)*, J.J. McMillan *(Psychology)*, W.H. Scott, John Zinner

Associate Clinical Professors H.P. Laughlin, I.H. Kaiser, David Eden, S.I. Szara *(Psychopharmacology)*, Hans Weil-Malherbe *(Neurochemistry)*, J.G. Rubin, E.S. Fleming, R.M. Greenberg, W.D. Kehne, J.L. Sheridan, J.H. Yacoubian, Jack Durell, Bennett Olshaker, H.B. Lehrman, I.H. Marill, T.D.

Reynolds *(Experimental Psychiatry)*, P.S. Weisberg, C.J. Frederick *(Medical Psychology)*, L.D. Robinson, A.S. Abraham, Belinda Straight, Joseph Baker, J.J. Francis, Angelo D'Agostino, W.J. Stockton, Roger Peele, J.T. Quattlebaum, D.D. Cowell, M.R. Haas, Robert Dupont, Jr., Ayres D'Costa, Bryant Wedge, P.F. Wohlford, J.H. Menetrez, B.L. Burris, C.C.H. Cullander, D.L. Tippett, Archibald Ward, Jr. *(Sociology)*, H.S. Winston, J.E. Meeks, Joseph Smith, H.M. Grigorian, R.M. Coleman, R.N. Butler, M.J. Stern, Giuseppe Scarcella, J.J. Katzow, J.B. Erdmann, John Zinner, Carolyn Robinowitz

Assistant Professors Jean Vazuka, B.B. Doyle, J.A. Frank, Jr., P.J. Steinglass, D.I. Davis, Kent Ravenscroft, Jr., Lawrence Sank, R.B. Gerber

Assistant Clinical Professors Sarah Tenenblatt, R.A. Rogers, J.A. Farrell, N.C. Rintz, F.G. Hilkert, I.D. Milowe, W.C. Johnson, R.A. Frank, Leslie Schaffer, T.M. Mackenzie, Christine Kehne, M.A. Woodbury, W.H. Young, Jr., J.H. Bouma, Spencer Gordon, Jr., W.L. Taylor *(Experimental Psychology)*, D.A. Lanham, Stephen Mourat, S.L. Auster, H.A. Greenberg, Gertrude Cotts, Margaret Garrett, H.A. Hoffman, J.M. Post, Erwin Friedman, R.A. McElroy, Frances Thomas *(Social Work)*, W.G. Tompkins, Brian Crowley, B.P. McKaig, William Davidson, J.A. Schoettler, Stephen Weissman, M.S. Glatt, A.E. Marans, Elma Denham, Pearl Holly, D.H. McKnew, Jr., L.A. Cove, Milton Engel, J.L. Evans, Larry Dizmang, Burton Pakull, C.R. Gray, M.J. Chalick, Geraldine Schaeffer, R.T. Lewit, A.M. Messore, W.F. Weber, R.W. Wadeson, Jr., M.T. Advani, Edward Black, D.H. Fram, A.B. Zients, G.A. Tripp, Michael Brody, David Grodsky, J.L. Hatleberg, K.L. Kaplan, D.D. Pollock, Armando Saenz, Eleanor Sorrentino, Lovisa Tatnall, Edith Taylor, S.J. Wolin, Stanley Greenspan, R.L. Fisher, Barton Kraff, D.Y. Patterson, Marianne Goldberger, G.L. Adams, D.J. Gardner, R.L. Gross, J.L. Wellhouse, J.W. Voell, Jocelyn Malkin, R.A. Ratner, D.R. Meers, F.J. Stoddard, S.H. Lipsius, Barry Landau, A.H. Stein, L.R. Conte, B.L. Frankel, P.A. Lange, N.A. Schweig, S.L. Billet, J.C. Chatel, K.P. Gorelick, Robert Hirschfeld, Harvey Steinberg, R.C. Bristol, R.M. Costell, M.D. Fitz, Rosalie Auster, L.D. Levi, S.L. Goodman, G.D. Legler, S.A. Savitz, W.F. Thompson, Martin Giller, Judith Chused, Joan Sealy, Marc Hertzman, S.K. Kalansky, R.A. Nover, Stephen Rosenblum, D.E. Scharff, J.L. Read, S.W. Anderson, G.A. Ellsworth, David Charney, E.C. Holscher, Jr., Carl Goldberg, F.K. Johnson

Instructors R.B. Gerber, Wynona Boren *(Social Work)*

Clinical Instructors Harold Plotsky, W.H. Dobbs, W.A. Hamman, D.G. Lipman, S.E. Samenow *(Psychology)*, D.I. Joseph, D.A. Berkowitz, Kenneth Kessler, E.R. Shapiro, Elaine Cotlove, Carmen Cabrera *(Psychiatric Social Work)*, P.E. Chanel, S.R. Pieczenik, C.B. Feinstein, Kathleen Owens *(Social Work)*, Anne Reese *(Social Work)*

Special Lecturer Julius Hoffman, J.T. English, Susan Fisher, J.B. Chassan *(Biostatistics)*, Paul Hamosh, Dean Schuyler, J.D. Robinson *(Visiting–Psychology)*

*252 **Development of the Person** Ravenscroft and Staff

For 1st-year medical students. Basic presentation of normal personality development. Principles of psychological aspects of human growth and development. (Spring)

* Required for medical students.

*301 **Introduction to Clinical Problem Solving** — Doyle and Staff
(Formerly Behavioral Sciences)

For 2nd-year medical students. Mental mechanisms, psychopathology, introduction to psychiatric syndromes, clinical interviewing, behavioral sciences in clinical medicine. (Fall)

*302 **Clinical Clerkship** — Webster, Katzow, Gerber, Hoffman, Scarcella, Boren, Giller, Ellsworth, and Staff

Supervised examination, diagnosis, treatment of outpatients and inpatients at University, St. Elizabeths, Washington Veterans Administration hospitals, Psychiatric Institute, and Area C Mental Health Center; case conferences, seminars on psychiatric referral, "psychiatric" drugs, community resources. Psychiatry in general practice stressed. (Fall and spring)

350 **Basic Psychopathology and Psychodynamics** — Bever

A seminar format using reading materials and clinical demonstrations to explore the basis of mental illness. Limited to 25 2nd-year medical students. (Fall)

351 **The Role and Professional Identity of the Physician** — Webster, Katzow, Robinowitz, Doyle

The class explores the personal and social factors of the role of the physician—the aspect of care, identity—through discussion conducted along group dynamic lines. Limited to 20 2nd-year medical students. (Fall and spring)

352 **Common Personality Configurations** — Lipsius

Selected commercial movies, viewed both during class and in student's free time, provide material illustrative of personality configurations and life styles to be analyzed in group discussions. Limited to 12 2nd-year medical students. (Fall)

353 **Basic Psychoanalytic Concepts** — Staff

Basic psychoanalytic concepts such as dreams, transference phenomena, the unconscious, and the various components of personality structure. Participation in discussions focusing on psychoanalytic issues and the relevance of such concepts to the practice of medicine in general. For first- or second-year medical students. Wash. Psychoanalytic Soc. Bldg. (Spring—8 sessions of 2 hours each)

354 **Human Sexuality** — Staff

Normal sexual development; unusual sexual patterns; emphasis on sexual patterns in the context of the individual's growth experiences and current life situation. For first- or second-year medical students. Wash. Psychoanalytic Soc. Bldg. (Spring—8 sessions of 2 hours each)

365–66 **Seminar: Clinical Introduction to Family Diagnosis and Therapy** (3–3) — Steinglass, Reiss, and Staff

Open to medical students and advanced students in clinical psychology.

382 **Clinical Psychiatry** — Cowell

Participation in clinical care of patients hospitalized for emotional and mental disturbances; individual and group therapy, somatic therapies, psychodrama. 4-week elective periods. St. Elizabeths Hosp.

* Required for medical students.

383 **Psychiatric Day Care** — Advani
Participation in the evaluation of patients referred for day care and in the various activities and programs in the day care center. Research pertaining to the day care center in its role in the treatment of psychiatric patients. 8-week elective periods. Psychiatric Inst. of Wash.

384 **Geriatric Psychiatry** — Cowell
Participation in care and rehabilitative efforts with elderly inpatients with psychiatric and other incapacities. 4-week elective periods. St. Elizabeths Hosp.

385 **Schizophrenic Reactions** — Bullard*
Observation and study of the administrative management and treatment of patients. Staff meetings, selected readings, individual instruction, complete case write-ups. 4-week elective periods. Chestnut Lodge, Rockville, Md.

386 **Psychiatric Research** — Cowell
Participation in research programs involving clinical and experimental investigations of human behavior. 4-week elective periods. St. Elizabeths Hosp.

387 **Clinical Psychiatry** — Katzow
Student admits patients, works with treatment team, organizes treatment plan, and treats patients in cooperation with and under supervision of other treatment team members. Emergency room and consultation work if desired. 4-, 8-, or 12-week elective periods. Univ. Hosp.

388 **Research: Chronic Patient** — Meyersburg
Research into social, anthropological, psychological factors influencing long-term care of patients with chronic diseases. 8-week elective periods. Univ. Hosp.

389 **Day Hospitalization** — Crowley
Participation in the diagnostic and treatment programs of a separate and independent day hospital designed to prevent and replace full-time psychiatric hospitalization. Research in the area of partial hospitalization. One to three 4-week elective periods. Potomac Foundation for Mental Health

390 **Extramural Psychiatry Elective** (arr.)
The Department arranges for students to spend elective periods at other institutions. Interested students should contact J.J. Katzow.

391 **Research: Constitutional Psychiatry and Psychiatric Aspects of Criminal Behavior** — S. Yochelson
(1) Somatotypy, genetics, encephalography, and sensory deprivation; emphasis on criminal behavior. (2) Detailed study of the social, anthropological factors producing criminal behavior; psychologic testing. 4- or 8-week elective periods. St. Elizabeths Hosp.

392 **Administrative Psychiatry** — Cowell
Practical problems of administering a large public psychiatric hospital. 4-week elective periods. St. Elizabeths Hosp.

393 **Independent Studies** — Webster, Katzow
Clinical or research experience and instruction in aspects of psychiatry not

* Dr. Bullard is Senior Consultant at Chestnut Lodge.

included in clerkship; selections on basis of individual student interest. 4-week elective periods. Univ. Clinic

394 **Elective in Forensic Psychiatry** **Sager**

Work in the rehabilitation of criminal offenders. 4-week elective periods. St. Elizabeths Hosp.

396 **Alcohol Inpatient Treatment**

Participation in evaluation and treatment of patients hospitalized for chronic alcoholism. 4- or 8-week elective periods. V.A. Hosp.

397 **Family Medicine** **Vazuka**

Working with medical outpatients who require some form of psychiatric intervention or evaluation of a brief nature. 4-week elective periods.

Radiology*

Chairman: S.D. Rockoff
Associate Chairman: D.O. Davis
Directors of Divisions: S.D. Rockoff *(Diagnostic Radiology)*, R.C. Reba *(Nuclear Medicine, Co-director)*, V.M. Varma *(Nuclear Medicine, Co-director)*, Theodore Villafaña *(Radiation Physics)*, J.G. Maier *(Radiation Therapy)*

Professors S.D. Rockoff, J.G. Maier *(Radiation Therapy)*, D.O. Davis, W.J. McSweeney, C.C. Rogers *(Radiation Therapy)*
Clinical Professors A.C. Wyman, M.M. Reeder, J.L. Doppman, Q.E. Crews, Jr., R.C. Reba *(Nuclear Medicine)*, J.J. Smith *(Nuclear Medicine)*, C.W. Ochs
Professorial Lecturer J.R. Andrews
Associate Professors Massoud Majd, V.M. Varma *(Nuclear Medicine)*, Kattadiyil Poulose *(Research—Nuclear Medicine)*, W.C. Eckelman *(Radiopharmacology)*, T.L. Lawson, D.L. Breckbill
Associate Clinical Professors H.J. Kicherer, R.M. Caulk, C.F. Murphy, W.J. Nelson, G.J. Augustin, M.L. Nusynowitz
Assistant Professors S.J. Kurzbard, Theodore Villafaña *(Radiation Physics)*, L.R. Kirkland, Jr. *(Radiation Physics)*, W.J. Bunnell, S.N. Lee *(Radiation Therapy)*, B.D. Pressman, Lennard Greenbaum, B.L. McClennan, Barry Potter, N.J. Smith *(Radiation Therapy)*
Assistant Clinical Professors S.R. Bersack, Marion Faris, A.S. Cigtay, V.K. Saini, M.A. Thomas, James Burwell, R.A. Butler, Sr., F.V. Schumacher, L.R. Milavickas, C.F. Tedford, P.T. Kirchner *(Nuclear Medicine)*, R.J. Lull, M.F. Moran, W.W. Olmsted, G.L. Smoron, Ralph Blumhardt, Eileen Bradley *(Radiobiology)*, W.C. Harvey, D.L. Johnson *(Nuclear Medicine Technology)*, M.C. Johnson, May Lim Lesar, D.J. Goodenough *(Radiation Physics)*, Richard Gordon *(Research)*, E.R. Jacobs
Instructors Sara Moore *(Radiation Therapy)*, Rebecca Beck *(Radiologic Technology)*, Dorothy Gibbons *(Nuclear Medicine)*
Clinical Instructors George Tievsky, S.M. Perl, Louis Wener, R.J. Morton, Jr., J.A. Thomas, Ezell Westbrook, K.E. Weaver *(Radiation Physics)*, W.G. Paullin

* Unless otherwise indicated, all faculty appointments are in the *Diagnostic Radiology* division.

Special Lecturers A.L. Byrne, L.F. Pridgen, F.R. Pugh, B.E. Smith, R.G. Conant, D.H. Manley, J.L. Naphier, G.E. Flook, W.E. Fulps, J.C. Hergenrother, W.F. Mellen, J.L. Firoved, M.J. Duea, P.E. Horsey, H.F. Midkiff, J.A. Waliszewski *(Nuclear Medicine)*, J.H. Coenen, B.A. Kendall, L.R. Oly, H.L. Hise, Jr., W.J. Weiler, J.H. Arthmann, C.E. Boccia, J.W. Brown, P.F. Jensen, W.B. Lowe, C.M. Richardson, J.W. Andrews, M.G. Withrow, Jr.

Courses numbered 40 through 190 are for students in the A.S. or B.S. degree programs in X-ray Techology, Nuclear Medicine, and Radiologic Science and Administration.

40 **Clinical Training and Experience in X-ray Technology I** (2) Staff
(Formerly six credit hours)
Instruction and close supervision in the use of radiologic techniques in examining the digestive, urinary, female reproductive, central nervous, and circulatory systems; chest and abdomen radiography, orthopaedic radiography, ENT and neurologic radiography, portable radiographic examinations, pediatric radiography, nuclear medicine, radiation therapy.

41 **Clinical Training and Experience in X-ray Technology II** (2) Staff
(Formerly Clinical Experience in Nuclear Medicine [9])
Continuation of Rad 40. Prerequisite: Rad 40.

42 **Clinical Training and Experience in X-ray Technology III** (2) Staff
Continuation of Rad 40 and 41. Prerequisite: Rad 40, 41.

43 **Clinical Experience in Nuclear Medicine I** (4) Staff
(Formerly Rad 41 [9])
Practical study and supervised performance; emphasis on indications and contraindications, procedures and methods, physiological and procedural factors which may result in a false study, radiation safety techniques, and administrative procedures.

44 **Clinical Experience in Nuclear Medicine II** (5) Staff
(Formerly Rad 41 [9])
Continuation of Clinical Experience in Nuclear Medicine I. Prerequisite: Rad 43.

50 **Radiologic Anatomy I** (4) Staff
Human anatomy as applied to radiologic terminology. Structure and function of the human skeleton and topographical anatomy, both normal and pathological. Prerequisite: Med 101 or equivalent.

51 **Radiologic Anatomy II** (4) Staff
Human anatomy as applied to radiographic procedures. Structural and functional approach, application to radiography of the digestive, respiratory, excretory, endocrine, reproductive, and nervous systems and the organs of special sense. Some discussion of medical and surgical diseases. Prerequisite: Rad 50.

55 **Stationary and Rectilinear Imaging** (3) Staff
Related anatomy, physiology, and pathology of imaging procedures; basic methodology of these and related procedures, including bone, brain, liver, liver function, bone marrow, lung, liver-lung, transmission, cardiac blood pool, cisternography, spleen, parathyroid, pancreas, lung ventilation, parotid ventriculography; miscellaneous scans; brain and cardiac flow studies

56 **Hematologic and Radionuclide Dilution Procedures** (3) **Staff**

Related anatomy, physiology, and pathology of hematologic and radionuclide dilution procedures; basic protocol for these procedures, including plasma volume and related plasma studies, red cell volume and related red cell studies, studies of iron metabolism, and the placental localization and scanning.

57 **Organ Concentration-Excretion Measurements** (3) **Staff**

Related anatomy, physiology, and pathology of organ concentration-excretion measurements; the procedure for those measurements, including thyroid uptake and its variations, thyroid scan, metastatic chest survey, renogram, renal scan, and renal flow study.

58 **Gastrointestinal Absorption Measurements** (1) **Staff**

Related anatomy, physiology, and pathology of gastrointestinal absorption measurements; the procedure for those measurements, including fat absorption studies (triolein and oleic acid) and the three stages of the vitamin B-12 absorption study (Schilling test).

59 **Competitive Binding Radioimmunoassay** (2) **Staff**

Basic concepts of radioassay; basic procedure for any competitive binding radioassay. Specific concepts and procedure for T3, T4, and serum B-12 determinations; factors affecting those determinations and the interpretation of their results.

60 **Radiographic Technique I** (4) **Staff**

Theoretical and practical study of X-ray machines, equipment, patient positioning, and radiographic qualities; history and development of X-ray, phototiming, X-ray tubes, and Bucky grids and their uses; anatomical landmarks, radiographic terminology, exposure factors, and variations; radiographic calibration (quality and quantity); marking of films and factors governing good film quality. Includes laboratory work.

61 **Radiographic Technique II** (4) **Staff**

Preparation of exposure charts and use of radiation protection devices; practical applications of technical uses of stationary and portable equipment under supervision; techniques for pediatric radiographs and methods of positioning and restriction; intra-oral radiography techniques. Photofluorographic chest units, departmental floor plans, basic office procedures. Includes laboratory work. Prerequisite: Rad 60.

62 **Darkroom Technology** (3) **Staff**

Processing of film after exposure; care and handling of conventional and automatic darkroom equipment; types of film, handling and storage; mixing and handling of chemicals and the action and quantity of these chemicals in the processing of film; effects of heat and cold on these chemicals, diagnosing of various improper developing techniques. Includes laboratory work.

65 **Basic Chemistry** (3) **Staff**

Introduction to basic chemistry, kinds of matter, atomic structure, the periodic table, chemical bonding, formulae and equations, solutions, acid-base reactions; introduction to organic chemistry and biochemistry; laboratory sessions.

66 **Radiopharmaceuticals** (3) Staff

Uses of radionuclides in medicine, basic principles of a Mo-99/Tc-99m generator, radiopharmaceuticals and their action within the body, preparation of radiopharmaceuticals using generator-produced nuclides, quality control, accountability, procurement, clinical orientation.

70 **Electronics of Radiology I** (4) Staff

Fundamental concepts of electricity such as battery types and construction, power and energy, simple circuits, series/parallel circuits, compound circuits. Description and function of various components of the circuits such as resistors and capacitors, magnetism and alternating current, magnetism and inductance, inductance and capacitance, and capacitance and transformers. Includes laboratory work.

71 **Electronics of Radiology II** (4) Staff

Applications of electronic principles to X-ray equipment and components; transformers, meters, generators, rectifiers, basic electronics; electron tubes and solid state devices; equipment trouble-shooting and maintenance. Includes laboratory work. Prerequisite: Rad 70.

72 **Radiation Instrumentation** (5) Staff

Theoretical and practical aspects of radiation detectors; types, components, and operation of detectors; collimators; geometry; introduction to rectilinear scanning; introduction to stationary imaging; clinical orientation.

75 **Fundamentals of Atomic and Nuclear Physics** (3) Staff

Basic units, quantum theory, Bohr theory, atomic and nuclear structure, radioactivity and decay, alpha and beta particles, electromagnetic radiation, series decay, radioactive equilibrium, I.C.R.U.

80 **Mathematics of Radiology** (3) Staff

Principles of mathematics as applicable to the physics of radiologic technology; use of the slide rule, including multiplication, division, powers, and roots; solution to linear equations in the unknown; cartesian coordinate plane; slope of straight line; determining linear equations from given conditions; graphic solution of two or more linear equations.

81 **Basic Mathematics** (3) Staff

Review of basic high school mathematics, basic algebra, common and natural logarithms and their manipulation, linear and logarithmic graphing and manipulation of a log-log side rule.

82 **Applied Technical Mathematics** (3) Staff

Mathematics as applicable to nuclear medicine; basic decay formula and its variations, calculation of doses of radionuclides, basic statistics terminology, frequency distributions, confidence limits, standard error, efficient distribution of counting time, statistics relating to rectilinear and stationary imaging.

90 **Ethics** (1) Staff

Ethics of physician/technician/patient relationships. Responsibilities, both moral and legal, to the doctor/patient and technologist relationship; the rapport expected of the technologist.

91 **Special Projects in Radiology** (arr.) **Staff**

Independent study on any aspect of radiology worked out between the student and the instructor.

92 **Basic Physics** (3) **Staff**

Remedial course for students deficient in physics training. Includes basic atomic structure, elements, molecules, compounds, electro and magnetic statics, motors, transformers, concepts of electricity, and circuits. Introduction to radiological physics including radiation protection, radiological units, and interactions of radiation with matter.

93 **Radiobiology and Radiation Dosimetry** (3) **Staff**

Interaction of radiation with matter; radiation effects on molecular, cellular, tissue, and organ levels; genetic and somatic effects of ionizing radiation; classical and M.I.R.D. methods of absorbed dose calculation.

94 **Radiological Safety** (3) **Staff**

Introduction to radiation safety; units of radiation exposure and dose; licensing; AEC regulations; accountability and records, receipt, storage, handling, transportation, and disposal of radioactive materials; monitoring; shielding; dose-distance relationships; personnel dosimetry; radiation illness; radiac instruments; radiation safety clothing; radioactive "spill" procedure.

95 **Radiation Safety** (3) **Staff**

Radiation tolerance, safety, and reporting photodosimetry; protective methods, control devices, shielding, half-life, detection, detection equipment, design and operation, thermoluminescence (its operation and uses), terminology and subject matter. Includes laboratory work.

96 **Radiation Biology** (3) **Staff**

Effects of radiation on basic cell structure through organ and whole body exposure; nature of radioactive particles and emissions, their effects on biological materials at the cellular and organismic level, particularly on the mammalian systems.

97 **Special Procedures** (3) **Staff**

Techniques of radiology employing contrast medias. Fluoroscopy, spot films, body section radiography, pelvimetry, placentography, location of foreign bodies of the eye, angiography, O.R. techniques, oral procedures, stereoscopy, pediatric angiographic procedures, etc. Prerequisite: Rad 61, 71.

98 **Therapy Procedures** (1) **Staff**

Introduction to radiation therapy and radium implants. Related anatomy, physiology, and pathology of phosphorous–32 and iodine–131 therapies and the technologist's responsibilities concerning them.

99 **Survey of Radiation Therapy and Nuclear Medicine** (3) **Staff**

Principles and practices of X-ray therapy and nuclear medicine techniques; purpose of radiation therapy and radioisotopes, their application, uses, types of equipment, and design. Prerequisite: Rad 51, 61, 71, 95, 96.

140 **Radiology Administration** (4) **Staff**

(Formerly five credit hours)

Instruction in the key areas of administration; human skills, technical

skills, and conceptual awareness as they pertain to radiologic management at the department level. Traditional management concepts and models developed through modern texts and current journals which address the topics of organizational behavior, planning, controlling, etc. Discussion and exploration of the logistics of managing a radiology section.

144 **Clinical Practicum: Diagnostic Radiology** (3) Rockoff
(Formerly Rad 141 [6])
For students concentrating in diagnostic radiology. Student performs clinically under supervision of a physician.

145 **Administrative Project: Diagnostic Radiology** (3) Staff
(Subject matter formerly covered in Rad 144, formerly six credit hours)
For students concentrating in diagnostic radiology. Students identify, develop, and produce a hypothetical radiology department using administrative principles. Prerequisite: Rad 140.

146 **Clinical Practicum: Nuclear Medicine** (3) Varma
(Formerly Rad 142 [6])
For students concentrating in nuclear medicine. Student performs clinically under supervision of a physician.

147 **Administrative Project: Nuclear Medicine** (3) Staff
(Subject matter formerly covered in former Rad 142 [6])
For students concentrating in nuclear medicine. Students identify, develop, and produce a hypothetical nuclear medicine department using administrative principles. Prerequisite: Rad 140.

148 **Clinical Practicum: Radiation Therapy** (3) Maier
(Formerly Rad 143 [6])
For students concentrating in radiation therapy. Student performs clinically under supervision of a physician.

149 **Administrative Project: Radiation Therapy** (3) Staff
(Subject matter formerly covered in former Rad 143 [6])
For students concentrating in radiation therapy. Students identify, develop, and produce a hypothetical radiation therapy department using administrative principles. Prerequisite: Rad 140.

167 **Radiation Physics and Safety I** (3) Staff
(Formerly Rad 170 [5])
Concepts of matter and energy and electromagnetic radiation. Mechanisms in the production of X-rays, X-ray circuits, including half-wave and full-wave rectification and 3-phase generators. Interaction of radiation with matter, emphasizing the photoelectric, Compton, and pair-production effect. Radiation detection and dosimetry, Roentgen rad and rem units of radiation. Radiation safety as applied to diagnostic radiology, nuclear medicine, and radiotherapy, including effects of time, distance, and shielding. Maximum permissible concentrations, internal dose problems.

168 **Radiation Physics and Safety II** (3) Staff
(Formerly Rad 170 [5])
Continuation of *Radiation Physics and Safety I*. Prerequisite: Rad 167

171 **Radiological Electronics and Engineering** (3) Staff
Introductory course designed to provide the student with an understanding of basic electronics as well as the operation, limitation, use and prin-

ciples in the selection of instrumentation as well as the ability to perform simple trouble-shooting of radiological equipment. Transistors, power supplies, amplifiers, as well as major circuit components of radiation detection instruments, gamma camera and rectilinear scanners, radiotherapy ortho-voltage and linear accelerators, and diagnostic radiography equipment.

175 **Physics of Radiological Imaging (3)** **Staff**

For students concentrating in diagnostic radiology. Image formation and transmission through radiological and related photo-optical devices, utilizing system analysis techniques. Concepts of sensitivity, contrast, and modulation transfer functions. Description and analysis of photo receptors, including film grids and Bucky and intensifier screens. Radiographic development process. Fluoroscopy, cine radiography, and video techniques; image storage electronic radiography; and solid state imaging panels. Ultra sonography and thermography. Prerequisite: Rad 167, 168.

176 **Physics of Nuclear Medicine (3)** **Staff**

For students concentrating in nuclear medicine. Concepts of radioactivity, including beta decay, isomeric transitions, electron capture, internal transition, alpha decay, and the auger effect. Isotopic half-life secular and transient equilibrium. Artificial transmutations, nuclear reactions, counting statistics, and selection of instrumentation. Scintillation spectrometry techniques. Rectilinear scanners, gamma camera, and computer technology in nuclear medicine. Prerequisite: Rad 167, 168.

177 **Dosimetry in Radiation Therapy (3)** **Staff**

For students concentrating in radiotherapy. Concepts of depth dose, isodose curves, and tissue air ratios for different energies, TSD, and field size. Techniques of treatment planning for stationary, multiple, and moving portals for Co-60 and megavoltage linear accelerators. Concepts of wedge fields and compensation for multiple TSD surfaces and tissue inhomogenities. Dosimetry of linear sources. Quimby and Paterson Parker dosimetry systems. Computer techniques in radiotherapy. Introduction to the dosimetry of electrons, neutrons, and the heavy particles. Prerequisite: Rad 167, 168.

190 **Radiobiology (3)** **Bradley, Schiff**

Advanced course involving biological aspects of radiation. Chemical, physical, and genetic effects of radiation on cells and organisms. Prerequisite: Rad 93 or 96.

383 **Clinical Radiology** **Wyman and Staff**

Radiologic differential diagnosis; emphasis on the role of diagnostic radiology in clinical problem-solving. Each student is assigned a patient population and correlates the radiologic examinations with the clinical manifestations of disease. The student prepares a brief clinical and radiological summary and participates in procedures, case conferences with staff members, and interaction with medical and surgical staff members. Daily lectures and staff conferences. Audio-visual self-instructing material. 4-week elective periods. Univ. Hosp.

384 **Diagnostic Radiology** **Burwell and Staff**

Participation in general radiography, fluoroscopy, and special procedures; interpretation of radiologic procedures with staff; review and study of teaching film file. Attendance at medical, surgical, and pediatric staff conferences. 4-week elective periods. Fairfax Hosp.

385 **Nuclear Medicine** — Varma, Reba, and Staff

Introduction to the physics of radioisotopes, radiochemistry, radiation detection, and instrumentation. Theory and operation of the nuclear camera and scanner. Study of organ imaging techniques, by lectures, conferences, and participation in patient care. Introduction to radio-immune assay. Correlation between clinical problems and nuclear diagnosis. 4-week elective periods. Univ. Hosp. and Wash. Hosp. Center

386 **Radiation Therapy** — Maier and Staff

Introduction to radiotherapeutic techniques, physics of high-energy radiation and instrumentation. Radiation treatment and correlated management of malignant diseases; emphasis on decision-making in a clinical practice. 4-week elective periods. Univ. Hosp.

387 **Subspecialty Diagnostic Radiology** — Staff

Subspecialty offerings include pulmonary, gastrointestinal, urologic, obstetric and gynecologic, neurologic, and pediatric. 4-week elective periods. Univ. Hosp.

388 **Diagnostic Radiology** — Reeder and Staff

Participation in general radiography, fluoroscopy, and special procedures; interpretation of radiologic procedures with staff; review and study of teaching film file; conferences. 4-week elective periods. Walter Reed Gen. Hosp.

389 **Diagnostic Radiology** — Ochs and Staff

Same as Rad 388. 4-week elective periods. Nat'l. Naval Med. Center

390 **Extramural Radiology Elective** (arr.)

The Department arranges for students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

391 **Diagnostic Radiology** — Schumacher and Staff

Same as Rad 388. 4-week elective periods. Wash. Hosp. Center

Surgery

Chairman: P.C. Adkins

Directors of Divisions: P.C. Adkins *(General Surgery, Thoracic and Cardiovascular Surgery)*, R.D. Shapiro *(Oral Surgery)*, J.G. Randolph *(Pediatric Surgery)*, L.W. Thompson *(Plastic Surgery)*

Professors C.T. Klopp, G.S. Letterman, J.G. Randolph, P.C. Adkins, Mitchell Mills, F.W. Plugge IV, J.E. McClenathan

Clinical Professors W.S. McCune, V.M. Iovine, G.A. Higgins, Jr., E.A. Gould, Frances Jackson, J.R. Thistlethwaite

Associate Professors H.C. Pierpont, T.C. Alford, P.E. Shorb, Jr., N.T. Tsangaris, W.L. Joseph, L.W. Thompson, W.J. Fouty, C.M. Herman, N.M. Rich, L.T. Bowles, Gerald Klebanoff, R.P. Altman, C.B. Wright

Associate Clinical Professors Maxine Schurter, N.P.D. Smyth, Leon Gerber, D.H. Glew, Jr., Don Wenger, R.W. Parsons, J.M. Keshishian, N.H. Isaacson, K.B. Absolon, W.D. Latham
Associate Professorial Lecturer L.E. Church *(Oral)*
Assistant Professors A.J. Slovin, Kathryn Anderson, R.W. Hobson II, D.W. Oller, C.L. Rice, F.M. Midgley
Assistant Clinical Professors William Ferguson, J.J. Weinstein, F.B. Brandt, J.W. Canter, J.B. Harrell, L.R. Perna, S.M. Kirson, Fernando Sacasa *(Oral)*, R.D. Shapiro *(Oral)*, J.D. Alford, C.A. Silva, R.L. Flax, R.R. Cameron, W.C. Dempsey *(Plastic)*, H.F. Sears II, D.L. Sturtz, H.A. Steimel, J.M. Giordano, G.B. Helfrich, B.S. Teunis, R.C. Shaw, William Gee, L.E. Smith, S.M. Knoll, E.M. Nathan, L.W. Gray
Instructor P.J. Corso
Clinical Instructors J.H. Sager, Sheldon Holen *(Periodontics)*, R.S. Siegel *(Oral)*, C.L. Magassy
Special Lecturer J.H. Bayly

*303 **Clinical Clerkship** — **Staff**

12 weeks at Univ. Hosp. and Nat'l. Naval Med. Center

376 **Advanced Surgery** — **Staff**

Participation in total patient care, including operative procedures under close supervision. 4-week elective periods. Andrews AFB Hosp., Nat'l. Naval Med. Center, Univ. Hosp., V.A. Hosp., Wash. Hosp. Center, Walter Reed Gen. Hosp.

378 **Intensive Care Unit** — **Absolon and Staff**

Introduction to the management of acutely ill surgical patients, including cases involving trauma; neurosurgery; and cardiovascular-thoracic, abdominal, and orthopaedic surgery. 4-week elective periods. Wash. Hosp. Center

379 **Transplantation Immunology**

Clinical renal transplantation and preservation. Daily teaching rounds, literature conference, seminar presentation, weekly surgical-medical nephrology rounds. 4-week elective periods. Wash. Hosp. Center

384 **Thoracic-Cardiovascular Surgery** — **Adkins**

Study of the basic principles used in thoracic and cardiovascular surgery. 4-week elective periods. Univ. Hosp. and Clinic

385 **Plastic Head and Neck Surgery** — **Thompson**

Participation in all activities, including preoperative and postoperative care, operating room procedures, clinical activities, conferences. Aesthetic surgery, head and neck cancer, maxillofacial trauma, hand surgery, congenital anomalies about the head and neck, and burns. 4-week elective periods. Univ. Hosp. and Clinic

386 **Pediatric Surgery** — **Randolph**

Participation in an active, closely supervised surgical service for infants and children, including congenital defects, cardiac surgery, trauma, and neoplasms. 4-week elective periods. Children's Hosp.

* Required for medical students.

387 **Plastic Head and Neck Surgery** Thompson, Parsons

Experience comparable to a surgical internship with integral participation in all activities of the service, including preoperative and postoperative care, operating room procedures, outpatient clinics, and conferences. Basic principles of wounds and their management, aesthetic and reconstructive surgery, and congenital anomalies. 4-week elective periods. Walter Reed Gen. Hosp.

388 **Plastic Surgery** Staff

Participation in an active plastic surgery service, principally aesthetic surgery, but also including other types of plastic surgery. Participation in out-patient clinics, operating room procedures, and conferences. 4-week elective periods. Nat'l. Naval Med. Center.

389 **Surgical Preceptorship** Iovine, McCune, Thistlethwaite, Isaacson

Participation in the care of general surgical patients as seen in private practice. 4-week elective periods.

390 **Extramural Surgery Elective** (arr.)

The Department arranges for students to spend one or more elective periods at other institutions. Students must have the approval of the Chairman of the Department.

392 **Peripheral Vascular Surgery** Keshishian, Smyth, Slovin

Study and application of vascular surgery. 4-week elective periods. Wash. Hosp. Center

395 **Experimental Surgery** Joseph

Participation in existing research projects and experimental operative procedures; assigned reading. 4-week elective periods. Surgical Research Lab., Warwick Bldg.

399 **Disaster Medicine** Pierpont

Emergency medical care; teaching films and discussion concerning management of "on the scene" trauma and mass casualty situations. (Fall)

Urology

Chairman: H.C. Miller, Jr.

Professors L.R. Culbertson, H.C. Miller, Jr.
Clinical Professors E.E. Ferguson, W.D. Jarman
Associate Professor Mitchell Edson
Associate Clinical Professors F.T. Reuter, H.A. Goldberg, Anthony Borski, F.J. Frensilli, Chalon Rodriguez
Assistant Professor H.S. Semerdjian
Assistant Clinical Professors Gilbert Ottenberg, R.C. Rhame, John Kenealy, George Dudas, H.J. Klapproth, R.E. Ware, W.L. Banfield III, I.S. Young, E.H. Soifer, I.J. Spence, D.M. Seitzman, B.T. Mittemeyer, Irwin Shuman, D.T. Schwartz, F.B. Hendricks

Clinical Instructors Hernando Salcedo, Barbara Black, T.A. MacLean, E.G. Abramson, J.B. Alperstein, R.A. Roth, B.I. Turner

380 **Clinical Urology** **Reuter**

Outpatient and diagnostic urology, cystoscopy and radiographic procedures. 4-week elective periods. Univ. Hosp.

381 **Clinical Urology** **Staff**

Observation of urologic conditions and procedures for diagnosis and treatment; radiologic and pathologic studies, endoscopy and surgery, collateral reading, weekly staff conference. 4-week elective periods. Univ. and V.A. Hosps., Nat'l. Naval Med. Center, Walter Reed Army Medical Center

382 **Clinical Urology** **Semerdijian**

Observation of urologic conditions and procedures for diagnosis and treatment, radiologic and pathologic studies, endoscopy and surgery, collateral reading, weekly staff conference. 4-week elective periods. V.A. Hosp.

383 **Clinical Urology** **Edson**

Outpatient and diagnostic urology; cystoscopic and operative urology. 4-week elective periods. Univ. Hosp. (2 weeks) and Nat'l. Naval Med. Center (2 weeks)

390 **Extramural Urology Elective** (arr.)

The Department arranges for students to spend elective periods in other institutions. Interested students should contact the Chairman of the Department.

THE SCHOOL OF MEDICINE AND HEALTH SCIENCES

Faculty and Staff of Instruction*

EMERITI

Theodore Judson Abernethy, *Professor Emeritus of Clinical Medicine*
B.S. 1925, Denison University; M.D. 1929, Johns Hopkins University

Errett Cyril Albritton, *Professor Emeritus of Physiology*
B.A. 1916, University of Missouri—Columbia; M.D. 1921, Johns Hopkins University

Louis Katz Alpert, *Professor Emeritus of Medicine*
B.S. 1928, M.D. 1932, Yale University

Harry Ford Anderson, *Professor Emeritus of Dermatology and Syphilology*
M.D. 1924, University of Cincinnati

William Staton Anderson, *Professor Emeritus of Clinical Child Health and Development*
B.A. 1927, Duke University; M.D. 1931, Johns Hopkins University

Brian Brewer Blades, *Professor Emeritus of Surgery*
B.A. 1928, University of Kansas; M.D. 1932, Washington University

Walter Andrew Bloedorn, *Professor Emeritus of Medicine*
M.D. 1909, Creighton University; B.A. 1915, M.A. 1916, Sc.D. 1948, George Washington University

Thomas McPherson Brown, *Professor Emeritus of Medicine*
B.A. 1929, Swarthmore College; M.D. 1933, Johns Hopkins University

Dexter Means Bullard, *Professor Emeritus of Clinical Psychiatry*
Ph.B. 1920, Yale University; M.D. 1923, University of Pennsylvania

Paul Calabrisi, *Professor Emeritus of Anatomy*
B.A. 1931, Catholic University of America; M.A. 1940, George Washington University; Ph.D. (Cantab.) 1955, University of Cambridge

Frank Duncan Costenbader, *Professor Emeritus of Clinical Ophthalmology*
B.S. 1925, Hampden-Sydney College; M.D. 1929, University of Virginia

Jeremiah Keith Cromer, *Professor Emeritus of Clinical Obstetrics and Gynecology*
M.D. 1929, B.A. 1931, George Washington University

* The Faculty and Staff of Instruction listed here and at the head of each department is for the academic year 1974–75. Faculty and staff members who hold appointments in two or more departments have the department of primary responsibility listed first.

Henry Lauran Darner, *Professor Emeritus of Clinical Obstetrics and Gynecology*
B.A. 1916, Western Maryland College; M.D. 1920, Johns Hopkins University

Paul Frederick Dickens, *Professor Emeritus of Clinical Medicine*
M.D. 1908, University of Nashville

Samuel Mayer Dodek, *Professor Emeritus of Clinical Obstetrics and Gynecology*
B.A. 1923, George Washington University; M.D. 1927, Thomas Jefferson University; M.A. 1931, Case Western Reserve University

William Rankin Duryee, *Research Professor Emeritus of Pathology (Experimental)*
B.A. 1927, Ph.D. 1933, Yale University

James Albert Dusbabek, *Professor Emeritus of Clinical Obstetrics and Gynecology*
M.D. 1934, George Washington University

Clayton Bernard Ethridge, *Professor Emeritus of Medicine*
M.D. 1933, University of Virginia

Clarence Kendall Fraser, *Professor Emeritus of Clinical Obstetrics and Gynecology*
Ph.B. 1931, College of the Holy Cross; M.D. 1935, Tufts University

James Quincy Gant, Jr., *Professor Emeritus of Clinical Dermatology*
B.A. 1930, M.S. 1931, Ohio State University; M.D. 1935, Medical College of Virginia of Virginia Commonwealth University

Alec Horwitz, *Professor Emeritus of Clinical Surgery*
B.A. 1920, M.D. 1923, George Washington University; M.S. in Surg. 1927, University of Minnesota

Hayden Kirby-Smith, *Professor Emeritus of Clinical Dermatology*
B.S. 1927, University of the South; M.D. 1937, George Washington University

Chester Elwood Leese, *Professor Emeritus of Physiology*
B.A. 1922, M.A. 1925, Ph.D. 1930, University of Iowa

Edward Lewis, *Professor Emeritus of Clinical Pediatrics*
M.D. 1918, George Washington University

Reginald Spencer Lourie, *Professor Emeritus of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.S. 1930, Cornell University; M.D. 1936, State University of New York Downstate Medical Center; Med.Sc.D. 1941, Columbia University

Preston Alexander McLendon, *Professor Emeritus of Pediatrics*
B.S. 1913, Wake Forest University; M.D. 1915, Columbia University

Daniel Bruce Moffett, *Professor Emeritus of Otolaryngology*
B.A. 1910, University of Richmond; M.D. 1915, University of Maryland

Margaret Mary Nicholson, *Professor Emeritus of Clinical Pediatrics*
B.A. 1922, M.D. 1925, George Washington University

George Nordlinger, *Professor Emeritus of Clinical Obstetrics and Gynecology*
B.A. 1918, M.D. 1922, George Washington University

Thomas Martin Peery, *Professor Emeritus of Pathology*
B.A. 1928, D.M.S. 1966, Newberry College; M.D. 1932, Medical University of South Carolina

Lois Irene Platt, *Associate Professor Emeritus of Pathology*
B.A. 1931, Goucher College; M.D. 1946, University of Maryland

Herbert Pollack, *Professor Emeritus of Clinical Medicine (Biochemistry)*
B.A. 1925, Washington and Lee University; M.D. 1929, Cornell University; Ph.D. 1933, University of Minnesota

Frederick A. Reuter, *Professor Emeritus of Urology*
M.D. 1916, George Washington University

Benjamin Rones, *Professor Emeritus of Clinical Ophthalmology*
B.A. 1922, M.D. 1926, Johns Hopkins University

Ernest Alfred Watson Sheppard, *Professor Emeritus of Clinical Ophthalmology*
M.D., C.M. 1926, Queens University, Canada

Donald Harrison Stubbs, *Professor Emeritus of Clinical Anesthesiology*
B.A. 1929, M.A. 1931, M.D. 1932, George Washington University

Ira Rockwood Telford, *Professor Emeritus of Anatomy*
B.A. 1931, M.A. 1933, University of Utah; Ph.D. 1942, George Washington University

Thomas Carlton Thompson, *Professor Emeritus of Clinical Urology*
B.S. in Med., M.D. 1920, George Washington University

Janet Graeme Travell, *Professor Emeritus of Clinical Medicine*
B.A. 1922, Wellesley College; M.D. 1926, Cornell University

John Augustine Washington, *Professor Emeritus of Clinical Child Health and Development*
B.A. 1924, Virginia Military Institute; B.S. 1926, University of Virginia; M.D. 1930, Johns Hopkins University

James Winston Watts, *Professor Emeritus of Neurological Surgery*
B.S. 1924, Virginia Military Institute; M.D. 1928, University of Virginia

Richard Wallace Wilkinson, *Professor Emeritus of Clinical Ophthalmology*
B.A. 1925, M.D. 1928, George Washington University; M.S. in Med. 1932, University of Pennsylvania

ACTIVE

Abe Samuel Abraham, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1938, Westminster College, Pennsylvania; M.D. 1950, George Washington University

Kristof Abraham, *Assistant Clinical Professor of Neurology*
M.D. 1952, Budapest University

Edward Gerald Abramson, *Clinical Instructor in Urology*
B.A. 1962, University of Pennsylvania; M.D. 1967, University of Virginia

Fred Paul Abramson, *Assistant Research Professor of Pathology and of Pharmacology*
B.A. 1962, Case Western Reserve University; Ph.D. 1965, Ohio State University

Karel Bedrich Absolon, *Associate Clinical Professor of Surgery*
M.B. 1948, Masaryck University, Czechoslovakia; M.D. 1952, Yale University; M.S., Ph.D. 1963, University of Minnesota

R. Marshall Ackerman, *Clinical Instructor in Orthopaedic Surgery*
B.S. 1958, M.D. 1962, University of Pittsburgh

George Leslie Adams, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences and of Medicine*
B.S. 1963, M.D. 1967, Tulane University of Louisiana

John Pletch Adams, *Professor of Orthopaedic Surgery and of Child Health and Development*
B.S. 1943, University of Missouri—Columbia; M.D. 1945, Washington University

Ann Evelyn Baryshyan Adcook, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1968, Marywood College

Edward Adelson, *Associate Clinical Professor of Medicine*
B.S. 1943, M.D. 1947, Tufts University

Paul Charles Adkins, *Lewis Saltz Professor of Surgery*
B.A. 1944, M.D. 1948, Johns Hopkins University

Mohan Teckchand Advani, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1955, Punjab University, India; M.B., B.S. 1960, Osmani University, India; D.P.M. 1964, Mysore University, India

Lewis Francis Affronti, *Professor of Microbiology*
B.A. 1950, M.A. 1951, State University of New York at Buffalo; Ph.D. 1958, Duke University

Cosimo Ajmone-Marsan, *Assistant Clinical Professor of Neurology*
M.D. 1942, University of Torino

Flavius Abiola Akerele, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1966, Boston University; M.D. 1970, George Washington University

Julio Estuardo Alarcon, *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1966, University of Trujillo, Peru

Chalom Albert, *Assistant Clinical Professor of Anesthesiology*
B.A. 1949, M.D. 1953, American University of Beirut

Dan George Albert, *Assistant Clinical Professor of Ophthalmology and of Child Health and Development*
B.S. 1938, Ohio State University; M.D. 1950, State University of New York Upstate Medical Center

Ernest Narinder Albert, *Associate Professor of Anatomy*
B.S. 1959, High Point College; M.S. 1963, University of Pittsburgh; Ph.D. 1965, Georgetown University

Solomon Naphtali Albert, *Associate Clinical Professor of Anesthesiology*
B.A. 1936, M.D. 1940, American University of Beirut

Yousef Al-Doory, *Associate Professor of Epidemiology and Environmental Health and of Pathology*
B.S. 1945, University of Baghdad; M.A. 1951, University of Texas at Austin; Ph.D. 1954, Louisiana State University and Agricultural and Mechanical College

Charles Edward Alexander, Jr., *Associate Professorial Lecturer in Epidemiology and Environmental Health*
B.A. 1951, Yale University; M.D. 1955, University of Pennsylvania; M.P.H. 1959, D.P.H. 1964, Johns Hopkins University

James David Alford, *Assistant Clinical Professor of Surgery*
B.A. 1959, M.D. 1966, University of North Carolina at Chapel Hill

Theodore Crandall Alford, *Associate Professor of Surgery*
B.A. 1944, Haverford College; M.D. 1947, Johns Hopkins University

Frank Duane Allan, *Professor of Anatomy*
B.S. 1947, M.S. 1949, University of Utah; Ph.D. 1954, Louisiana State University and Agricultural and Mechanical College

Melvin Gustavus Alper, *Clinical Professor of Ophthalmology*
B.A. 1943, M.D. 1945, University of Virginia

Joel Barry Alperstein, *Clinical Instructor in Urology*
B.S. 1961, M.D. 1967, University of Maryland

Hubert Joseph Alpert, *Clinical Instructor in Medicine*
M.D. 1962, University of Illinois at the Medical Center

Seymour Alpert, *Professor of Anesthesiology; Vice President of the University, for Development*
B.A. 1939, Columbia University; M.D. 1943, State University of New York Downstate Medical Center

Roy Peter Altman, *Associate Professor of Surgery and of Child Health and Development*
B.A. 1955, Colgate University; M.S. 1958, University of Rochester; M.D. 1961, New York Medical College

Alice Hackney Altstatt, *Assistant Professor of Anesthesiology*
B.A. 1949, Bryn Mawr College; M.A. 1952, M.D. 1956, Vanderbilt University

Sirus Amiri, *Clinical Instructor in Child Health and Development*
M.D. 1956, University of Tehran

Harvey Hirsch Ammerman, *Clinical Professor of Neurological Surgery*
B.S. 1939, M.D. 1943, George Washington University

Arthur James Anderson, *Assistant Clinical Professor of Medicine*
M.D. 1961, George Washington University

Elizabeth Potts Anderson, *Professorial Lecturer in Biochemistry*
B.A. 1945, Sarah Lawrence College; M.S. 1947, University of Wisconsin—Madison; Ph.D. 1950, Stanford University

James Edward Anderson, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1955, Union College, Nebraska; M.D. 1965, Loma Linda University

Kathryn Duncan Anderson, *Assistant Professor of Surgery and of Child Health and Development*
B.A. 1961, M.A. 1964, University of Cambridge; M.D. 1964, Harvard University

Seawright Wilbur Anderson, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1950, Howard University

J. Robert Andrews, *Professorial Lecturer in Radiology*
Ph.B. 1928, Brown University; M.D. 1932, Case Western Reserve University; D.Sc. 1946, University of Pennsylvania

Jack William Andrews, *Special Lecturer in Radiology*

John Lawrence Angel, *Professorial Lecturer in Anatomy and Anthropology*
B.A. 1936, Ph.D. 1942, Harvard University

Robert Maurice Anglin, *Special Lecturer in Pathology*

Tatiana Antonovych, *Professorial Lecturer in Pathology*
M.D. 1941, University of Vienna

Leonard Philip Appel, *Clinical Instructor in Medicine*
B.A. 1953, M.D. 1957, New York University

Irwin Ardam, *Assistant Clinical Professor of Medicine*
B.A. 1948, New York University; M.D. 1954, New York Medical College

John William Argent, Jr., *Special Lecturer in Epidemiology and Environmental Health*

Victor Arturo Argumedo, *Assistant Professor of Anesthesiology and of Child Health and Development*
M.B., B.S. 1966, University of San Marcos, Peru

Bryan Arling, *Assistant Professor of Medicine*
B.A. 1965, University of Minnesota; M.D. 1969, Harvard University

Mansour Farid Armaly, *Professor of Ophthalmology*
B.A. 1947, M.D. 1952, American University of Beirut; M.S. 1957, University of Iowa

Malcolm Stewart Artenstein, *Clinical Professor of Medicine*
B.A. 1951, Brown University; M.D. 1955, Tufts University

James Hiram Arthmann, *Special Lecturer in Radiology*

Philip Assatourians, *Assistant Professor of Medicine*
M.D. 1964, University of Tehran

Abdellfattah Mohamed Attallah, *Research Instructor in Child Health and Development*
B.S. 1967, Alexandria University; D.E.A. 1971, University of Paris; Ph.D. 1974, George Washington University

Gilbert Paul August, *Associate Professor of Child Health and Development*
B.S. 1958, City University of New York, City College; M.D. 1962, New York University

Gunter Josef Augustin, *Associate Clinical Professor of Radiology*
M.D. 1952, University of Heidelberg

Rosalie Meissner Auster, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1961, University of Connecticut; M.D. 1965, Boston University

Simon Leo Auster, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1952, Yeshiva University; M.D. 1956, New York University

Gordon Avery, *Professor of Child Health and Development*
B.A. 1953, Harvard University; M.D. 1958, Ph.D. 1959, University of Pennsylvania

Julius Axelrod, *Distinguished Professor of Science; Professorial Lecturer in Pharmacology*
B.S. 1933, City University of New York, City College; M.A. 1941, New York University; Ph.D. 1955, LL.D. 1971, George Washington University; Sc.D. 1966, University of Chicago

Silas Babin, Jr., *Assistant Clinical Professor of Medicine*
M.D. 1951, Louisiana State University Medical Center, New Orleans

James Michael Bacos, *Professor of Medicine*
B.S. 1948, Virginia Polytechnic Institute and State University; M.D. 1953, Duke University

Robert Emil Badwey, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1955, Franklin and Marshall College; M.D. 1959, University of Pittsburgh

Alfred Baer, *Associate Clinical Professor of Medicine*
B.A. 1942, Ohio State University; M.D. 1945, Johns Hopkins University

William Eldridge Bageant, *Assistant Clinical Professor of Anesthesiology*
M.D. 1939, George Washington University

David Whitney Bailey, *Associate Professor of Child Health and Development*
B.A. 1954, Bowdoin College; M.D., C.M. 1958, McGill University

George William Bailey, *Assistant Professor of Health Care Sciences and of Child Health and Development*
B.A. 1963, Birmingham-Southern College; M.D. 1967, University of Alabama in Birmingham

John Martyn Bailey, *Professor of Biochemistry*
B.S. 1949, Ph.D. 1952, D.Sc. 1970, University of Wales

William Otis Bailey, Jr., *Associate Clinical Professor of Medicine*
M.D. 1940, George Washington University

George Ivan Baker, *Assistant Clinical Professor of Orthopaedic Surgery*
B.A. 1950, Syracuse University; M.D. 1954, State University of New York Upstate Medical Center

Joseph Baker, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1940, Sc.D. 1970, Gettysburg College; M.D. 1944, Temple University

Stewart Lee Baker, Jr., *Clinical Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
B.S. 1942, University of Maryland; M.D. 1945, George Washington University

William Prentice Baker, *Professor of Medicine*
B.S. 1949, Indiana University; M.S. 1953, Ph.D. 1955, Michigan State University; M.D. 1959, University of Michigan

Guillermo Alfredo Balfour, *Assistant Clinical Professor of Child Health and Development*
M.D. 1959, University of Buenos Aires

Giuseppe Balsamo, *Assistant Clinical Professor of Medicine*
Laurea in Medicinae Chirurgia 1952, University of Rome

Bernard Alvin Band, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1952, B.S. 1954, George Washington University; M.D. 1959, Howard University

William Landon Banfield III, *Assistant Clinical Professor of Urology*
B.A. 1954, Princeton University; M.D. 1958, George Washington University

James Elmer Banta, *Professorial Lecturer in Epidemiology and Environmental Health*
M.D. 1950, Marquette University; M.P.H. 1954, Johns Hopkins University

Lilia Belardo Giron Banzon, *Assistant Professor of Anesthesiology and of Child Health and Development*
M.D. 1959, University of Santo Tomas, Philippines

Lewellys Franklin Barker, *Assistant Clinical Professor of Medicine*
B.A. 1955, Princeton University; M.D. 1959, Johns Hopkins University

Ann Birnbaum Barnet, *Associate Professor of Neurology and of Child Health and Development*
B.A. 1951, Sarah Lawrence College; M.D. 1956, Harvard University

Kenneth Brian Barr, *Assistant Clinical Professor of Pathology (Laboratory Medicine)*
B.A. 1964, Adams State College

Norman Lee Barr, Jr., *Clinical Instructor in Otolaryngology*
B.A. 1959, Princeton University; M.D. 1965, Georgetown University

Solomon Efrem Barr, *Assistant Clinical Professor of Medicine*
B.A. 1951, M.D. 1954, George Washington University

John William Barrett, *Assistant Clinical Professor of Neurological Surgery*
M.D. 1958, George Washington University

Robert Henry Barter, *Professor of Obstetrics and Gynecology*
B.S. 1937, M.D. 1940, University of Wisconsin—Madison

Werner Franklin Barth, *Associate Professor of Medicine*
B.A. 1956, Columbia University; M.D. 1960, Yeshiva University

Ramez Bassir, *Instructor in Clinical Engineering*
M.D. 1969, Nagoya University, Japan

Constance Urciolo Battle, *Associate Professor of Child Health and Development*
B.A. 1963, Trinity College, District of Columbia; M.D. 1967, George Washington University

Marianne Bayley, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1963, University of Vermont; M.S. 1974, University of Maryland

John Henry Bayly, *Special Lecturer in Surgery and in Child Health and Development*
B.S. 1936, Rensselaer Polytechnic Institute; M.D. 1940, Georgetown University

David Lionel Bazelon, *Clinical Professor of Psychiatry and Behavioral Sciences (Socio-legal Aspects)*
B.S. in Law 1931, Northwestern University; LL.D. 1966, Colby College

Mary Garven Beale, *Instructor in Child Health and Development*
B.A. 1966, Wellesley College; M.D. 1970, Johns Hopkins University

Lillian McLean Beard, *Clinical Instructor in Child Health and Development*
B.S. 1965, M.D. 1970, Howard University

Harry Carl Beaver, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1959, Wheaton College, Illinois; M.D. 1963, George Washington University

Rebecca Mae Styrlund Beck, *Instructor in Radiology (Radiologic Technology)*
B.S. 1974, University of Minnesota

Arthur Abbe Becker, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1956, City University of New York, City College; M.D. 1961, University of Iowa

Kenneth Louis Becker, *Associate Professor of Medicine*
B.A. 1952, University of Michigan; M.D. 1956, New York Medical College; Ph.D. 1963, University of Minnesota

Samuel Michael Belinsky, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1955, University of Bridgeport; M.D. 1959, George Washington University

Leopold Bellak, *Clinical Professor of Psychiatry and Behavioral Sciences*
M.A. 1939, Boston University; M.A. 1942, Harvard University; M.D. 1944, New York Medical College

Ruth Boschwitz Benedict, *Associate Clinical Professor of Medicine*
B.A. 1935, Wellesley College; M.D. 1939, New York University

Robert Allen Berenson, *Clinical Instructor in Health Care Sciences and in Medicine*
B.A. 1968, Brandeis University; M.M.S. 1970, Rutgers University, New Brunswick; M.D. 1972, City University of New York, Mount Sinai School of Medicine

Peter Morris Berkman, *Assistant Professor of Medicine*
B.A. 1955, Harvard University; M.D. 1959, Columbia University

David Alan Berkowitz, *Clinical Instructor in Psychiatry and Behavioral Sciences*
B.A. 1965, Brandeis University; M.D. 1969, Yale University

David Kip Berler, *Assistant Clinical Professor of Ophthalmology*
B.A. 1955, M.D. 1958, Cornell University

Cheston Milton Berlin, Jr., *Special Lecturer in Child Health and Development*
B.A. 1958, Haverford College; M.D. 1962, Harvard University

Howard Hillel Berman, *Assistant Clinical Professor of Pathology*
B.A. 1958, Duke University; M.D. 1962, Columbia University

Sidney Berman, *Clinical Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
B.S. 1928, M.D. 1932, Georgetown University

Howard Nathan Bernstein, *Assistant Clinical Professor of Ophthalmology*
B.S. 1953, Bucknell University; M.D. 1957, State University of New York Downstate Medical Center

Leon Bernstein, *Professor of Medicine*
B.S. 1939, Ph.D. 1957, University of London; L.R.C.P. 1949, Royal College of Physicians, England; M.R.C.S. 1949, Royal College of Surgeons, England

John David Berryman, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1962, Swarthmore College; M.S. 1964, Case Western Reserve University; M.D. 1967, University of Virginia

Solomon Rodney Bersack, *Assistant Clinical Professor of Radiology*
B.S. 1931, City University of New York, City College; M.D. 1935, New York University

Alan Berson, *Assistant Research Professor of Clinical Engineering*
B.E.E. 1950, City University of New York, City College; M.S. in Engr. 1965, George Washington University; Ph.D. 1972, Georgetown University

Christopher Theodore Bever, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1940, M.D. 1943, Harvard University

Lewis Henry Biben, *Assistant Clinical Professor of Medicine*
M.D. 1949, Hahnemann Medical College

Charles Joel Bier, *Instructor in Medicine*
B.A. 1965, M.D. 1968, George Washington University

Sanford Louis Billet, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1947, New York University; M.D. 1951, University of Cincinnati

Donald Gene Birdwell, *Special Lecturer in Epidemiology and Environmental Health*

Peter Birk, *Associate Clinical Professor of Medicine and of Health Care Sciences*
B.A. 1955, Princeton University; M.D. 1959, Cornell University

Philip Stanley Birnbaum, *Adjunct Associate Professor of Health Care Administration; Dean for Administrative Affairs of the Medical Center*
B.S. in M.E. 1948, M.S. in M.E. 1949, Carnegie-Mellon University; B.C.E. 1954, Rensselaer Polytechnic Institute

Calvin Franklin Bishop, *Clinical Professor of Pathology (Laboratory Medicine)*
B.S. 1950, Baylor University; M.D. 1953, University of Texas Southwestern Medical School at Dallas

Barbara Onderchek Black, *Clinical Instructor in Urology*
B.A. 1962, Trinity College, District of Columbia; M.D. 1966, Georgetown University

Edward Black, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1959, Dickinson College; M.D. 1963, New York Medical College

Emilie Annabelle Black, *Clinical Instructor in Child Health and Development*
B.S. 1942, M.D. 1945, George Washington University

Brian Douglas Blackbourne, *Assistant Clinical Professor of Pathology (Forensic)*
M.D. 1962, University of Alberta

Ethel Joan Blanchette-Mackie, *Associate Professorial Lecturer in Anatomy*
B.S. 1956, City University of New York, Queens College; M.S. 1959, New York University. Ph.D. 1965, Columbia University

Ronald Ray Blanck, *Associate Professorial Lecturer in Medicine*
D.O. 1967, Philadelphia College of Osteopathic Medicine

Vay John Blazina, *Clinical Instructor in Neurology*
B.A. 1963, University of Washington; M.D. 1967, George Washington University

Dick Edward Blessing, *Special Lecturer in Pathology*

Joe Morris Blumberg, *Clinical Professor of Pathology*
B.S. 1930, M.D. 1933, Emory University

Ralph Blumhardt, *Assistant Clinical Professor of Radiology*
M.D. 1963, Hahnemann Medical College

Robert Joel Bobys, *Clinical Instructor in Otolaryngology*
M.D. 1963, Georgetown University

Conwell Edward Boccia, *Special Lecturer in Radiology*

George Pierce Bogumill, *Assistant Clinical Professor of Orthopaedic Surgery and of Anatomy*
B.S. 1952, M.S. 1954, Ph.D. 1955, M.D. 1959, University of Wisconsin—Madison

Norman Kay Bohrer, *Clinical Instructor in Medicine*
M.D. 1957, George Washington University

Ernest Bollin, Jr., *Special Lecturer in Pathology*
B.S. 1967, Cornell University; M.S. 1970, Purdue University

Sylvester Courtney Booker, *Special Lecturer in Obstetrics and Gynecology*
B.S. 1960, M.D. 1964, Howard University

Wynona June Gottlieb Boren, *Instructor in Psychiatry and Behavioral Sciences (Social Work)*
B.A. 1970, M.S.W. 1972, University of Maryland

Anthony Borski, *Associate Clinical Professor of Urology*
B.A. 1946, University of Denver; M.D. 1950, University of Colorado

Frank Joseph Borsody, *Clinical Instructor in Medicine*
B.A. 1955, George Washington University; M.D. 1960, University of Virginia

John Andrew Bottiglione, *Special Lecturer in Child Health and Development*
B.S. 1958, University of Notre Dame; M.D. 1962, Seton Hall University

John Henry Bouma, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1948, B.S. 1949, M.B. 1952, M.D. 1953, University of Minnesota

Isabella Blanche Bourne, *Associate Clinical Professor of Child Health and Development*
B.S. 1937, Morgan State College; M.D. 1941, Howard University

Lawrence Thompson Bowles, *Associate Professor of Surgery; Associate Dean for Curricular and Student Affairs of the Medical Center*
B.A. 1953, M.D. 1957, Duke University; M.S. 1964, Ph.D. 1971, New York University

Henry Alexander Bradford, *Associate Professorial Lecturer in Epidemiology and Environmental Health*
B.A. 1961, University of Colorado; M.S. 1967, University of California, Los Angeles

Eileen Walkavich Bradley, *Assistant Clinical Professor of Radiology (Radiobiology)*
B.A. 1966, Anna Maria College for Women; M.S. 1968, Sc.D. 1971, Harvard University

Carl David Brandt, *Associate Professor of Child Health and Development (Microbiology)*
B.S. 1949, University of Connecticut; M.S. 1951, University of Massachusetts—Amherst; Ph.D. 1958, Harvard University

Frederick Bertram Brandt, *Assistant Clinical Professor of Surgery*
B.S. 1942, M.D. 1943, University of Maryland

M. Eduardo Bravo, *Clinical Instructor in Child Health and Development*
B.S., M.D. 1966, Peruvian University

David Latimer Breckbill, *Associate Professor of Radiology and of Child Health and Development*
B.S. 1960, Westmar College; M.D. 1964, University of Kansas

Gloria Godbey Brennan, *Assistant Clinical Professor of Pathology*
B.A. 1949, M.D. 1952, George Washington University

Alexander Breslow, *Professor of Pathology*
B.S. 1948, M.S., M.D. 1953, University of Chicago

Diane Margaret Brickley, *Assistant Research Professor of Orthopaedic Surgery*
B.A. 1967, Newton College; Ph.D. 1972, Boston University

William Herndon Brigge, *Special Lecturer in Epidemiology and Environmental Health*

Albert Seymour Bright, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1935, M.D. 1938, George Washington University

Warren Daniel Brill, *Associate Clinical Professor of Medicine*
B.S., M.D. 1944, University of Maryland

Raymond Curtis Bristol, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1958, Stanford University; M.D. 1962, University of Southern California

Michael Brody, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1962, New York University; M.D. 1966, New York Medical College

Bertram Brown, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1952, City University of New York, Brooklyn College; M.D. 1956, Cornell University; M.P.H. 1960, Harvard University

Crawford Southwell Brown, *Assistant Clinical Professor of Dermatology*
B.A. 1946, Kenyon College; M.D. 1948, University of Michigan

Jay Wilford Brown, *Special Lecturer in Radiology*

William Harris Browning, *Assistant Clinical Professor of Orthopaedic Surgery and of Child Health and Development*
B.A. 1955, Dartmouth College; M.D. 1964, Stanford University

Blackwell Smith Bruner, *Clinical Instructor in Ophthalmology and in Child Health and Development*
M.D. 1963, George Washington University

Philip Craig Brunschwyler, *Associate Clinical Professor of Child Health and Development*
B.A. 1951, West Virginia University; M.D. 1955, University of Maryland

Charles Walter Buchan, *Special Lecturer in Epidemiology and Environmental Health*

George Cumming Buchanan, *Assistant Clinical Professor of Medicine*
B.A. 1943, Duke University; M.D. 1948, Johns Hopkins University

Verlin Dalbert Buechler, *Special Lecturer in Epidemiology and Environmental Health*

Roger James Bulger, *Professor of Medicine*
B.A. 1955, M.D. 1960, Harvard University

Bill Bunnag, *Research Instructor in Obstetrics and Gynecology (Cytology)*
B.S. 1965, M.S. 1968, M.Phil. 1971, Ph.D. 1973, George Washington University

William Joseph Bunnell, *Assistant Professor of Radiology*
B.S. 1969, Ball State University; M.S. 1970, University of Cincinnati

James Matthew Burgin, *Clinical Instructor in Child Health and Development*
B.A. 1962, Haverford College; M.D. 1966, Columbia University

Michael Seth Burnhill, *Associate Clinical Professor of Obstetrics and Gynecology*
B.A. 1949, Syracuse University; M.D. 1953, University of Vermont; D.M.S. 1971, State University of New York Downstate Medical Center

Willard Ambrose Burns, *Associate Professor of Pathology*
B.S. 1951, Fordham University; M.D. 1958, University of Lausanne

William Wesley Burr, Jr., *Professorial Lecturer in Biochemistry (Isotopes)*
B.A. 1947, University of Nebraska; M.S. 1948, Ph.D. 1951, University of Illinois at Urbana-Champaign; M.D. 1960, University of Texas Southwestern Medical School at Dallas

Boyd Lee Burris, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1951, University of Tennessee, Knoxville; M.D. 1952, University of Tennessee Medical Units

James Burwell, *Assistant Clinical Professor of Radiology*
B.A. 1952, University of Pittsburgh; M.D. 1956, University of Maryland

Stewart William Bush, *Associate Clinical Professor of Medicine*
B.S. 1943, University of Massachusetts—Amherst; M.D. 1946, Johns Hopkins University

Ann Benedict Butler, *Assistant Professor of Anatomy*
B.A. 1967, Oberlin College; Ph.D. 1971, Case Western Reserve University

Raymond Andrew Butler, Sr., *Assistant Clinical Professor of Radiology*
B.S. in Gen.Std. 1971, George Washington University

Robert Neil Butler, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1949, M.D. 1953, Columbia University

Arthur Lawrence Byrne, *Special Lecturer in Radiology*

Carmen V.A. Cabrera, *Clinical Instructor in Psychiatry and Behavioral Sciences (Psychiatric Social Work)*
B.S. 1932, University of Puerto Rico; M.A. 1944, University of Chicago

Eugene Cyril Cager, *Special Lecturer in Pathology*

Richard Anderson Cahill, *Assistant Professor of Child Health and Development*
B.S. 1963, M.D. 1967, St. Louis University

Dale Corbin Cameron, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1933, M.D. 1936, University of Nebraska; M.P.H. 1951, Johns Hopkins University

Ronald Ross Cameron, *Assistant Clinical Professor of Surgery*
B.A. 1953, Johns Hopkins University; M.D. 1957, University of Maryland

Carlena Lee Campbell, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1955, West Virginia University; M.D. 1957, Medical College of Virginia of Virginia Commonwealth University

Jerome Wolf Canter, *Assistant Clinical Professor of Surgery*
M.D. 1955, George Washington University

Johnie Carlisle, Jr., *Special Lecturer in Epidemiology and Environmental Health*

David Roland Carlson, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1953, Drake University; M.D. 1960, George Washington University

David Orlo Carpenter, *Professorial Lecturer in Physiology*
B.A. 1959, M.D. 1964, Harvard University

Thomas Douglas Carpenter, *Special Lecturer in Pathology*

Noel Austen Carr, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1962, M.D. 1968, Howard University

Charles Patrick Henry Carroll, *Assistant Clinical Professor of Neurological Surgery*
B.A. 1952, Boston College; M.D. 1961, Georgetown University

David Thornhill Casey, *Clinical Instructor in Ophthalmology*
B.S. 1960, University of Pittsburgh; M.D. 1964, Hahnemann Medical College

Barry Allen Cassidy, *Instructor in Health Care Sciences*

Marie Mullaney Cassidy, *Professor of Physiology*
B.S. (General) 1957, B.S. (Special) 1958, M.S. 1959, Ph.D. 1962, National University of Ireland

Richard Bernard Castell, *Assistant Clinical Professor of Medicine*
B.A. 1932, M.D. 1935, George Washington University

Rosella Decena Castro, *Instructor in Child Health and Development*
B.A. 1959, Philippine Union College; M.D. 1964, Manila Central University

David Methven Cathro, *Assistant Clinical Professor of Child Health and Development*
M.B., Ch.B. 1954, M.D. 1964, University of Edinburgh

Hereward Seagrieve Cattell, *Assistant Clinical Professor of Orthopaedic Surgery*
B.A. 1954, Amherst College; M.D. 1958, University of Rochester

Ralph Mearle Caulk, *Associate Clinical Professor of Radiology*
M.D. 1934, University of Kansas

William Paxson Chalfant, Jr., *Assistant Clinical Professor of Ophthalmology*
M.D. 1934, Hahnemann Medical College

Morris Jay Chalick, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1958, University of Pennsylvania; M.D. 1962, Thomas Jefferson University

John Loomis Chamberlain III, *Associate Clinical Professor of Child Health and Development*
B.S. 1953, Amherst College; M.D. 1957, University of Virginia

Chao Hung Chan, *Assistant Professor of Medicine*
B.B.A. 1955, M.D. 1962, University of the East, Philippines

James Chiu Ming Chan, *Associate Professor of Child Health and Development*
M.D. 1964, McGill University

Roma Sakhuja Chandra, *Special Lecturer in Child Health and Development and in Pathology*
M.B., B.S. 1958, Lady Hardinge Medical College, India

Philippe Ernest Chanel, *Clinical Instructor in Psychiatry and Behavioral Sciences*
M.D. 1970, University of Lausanne, Switzerland

Paul P.L. Chang, *Assistant Clinical Professor of Medicine*
M.D. 1959, National Taiwan University

Robert Merritt Chanock, *Professor of Child Health and Development*
B.S. 1945, M.D. 1947, University of Chicago

Dorothea Beckh Chapman, *Assistant Clinical Professor of Medicine*
M.D. 1945, Leopold-Franzens University, Austria

Jack Dowman Chapman II, *Special Lecturer in Epidemiology and Environmental Health*

George Allyn Chapman, *Assistant Clinical Professor of Medicine*
B.S. 1942, College of William and Mary; M.D. 1945, Medical College of Virginia of Virginia Commonwealth University

Nan-Huan Char, *Clinical Instructor in Anesthesiology*
M.D. 1964, Kaohsiung Medical College, Taiwan

David Charney, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1964, City University of New York, Brooklyn College; M.D. 1968, State University of New York Upstate Medical Center

Kenneth Herbert Chase, *Assistant Professor of Medicine*
B.A. 1964, M.D. 1968, University of California, Los Angeles

Jacob Bernard Chassan, *Special Lecturer in Psychiatry and Behavioral Sciences (Biostatistics)*
B.S. 1939, City University of New York, City College; M.A. 1949, Ph.D. 1958, George Washington University

John Charles Chatel, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1961, George Washington University; M.D. 1965, Creighton University

Tsung O. Cheng, *Professor of Medicine*
B.S. 1947, M.D. 1950, St. John's University, China; M.S. 1956, University of Pennsylvania

Viola Wai Chiu Cheng, *Clinical Instructor in Child Health and Development*
M.D. 1961, National Taiwan University

Ronald August Chez, *Clinical Professor of Obstetrics and Gynecology*
B.A. 1953, Johns Hopkins University; M.D. 1957, Cornell University

William Robert Chiarulli, *Special Lecturer in Epidemiology and Environmental Health*

Cecilin Chisholm, *Clinical Instructor in Child Health and Development*
B.S. 1963, M.D. 1967, Howard University

Wu Shung Chiu, *Assistant Professor of Medicine*
M.D. 1959, National Taiwan University

Paul Chodoff, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1934, University of Pennsylvania; M.D. 1938, Thomas Jefferson University

Byung-Il Choi, *Clinical Instructor in Medicine*
M.D. 1965, Severance Medical College, Korea

Joginder Gurbux Chopra, *Assistant Clinical Professor of Child Health and Development*
M.D. 1954, Bombay University; M.S., M.P.H. 1961, Columbia University

Linda Diane Christoffersen, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1971, University of Wyoming

Nicholas Louis Christopher, *Associate Clinical Professor of Medicine*
B.A. 1959, M.D. 1963, University of Michigan

Yang-Ming Chu, *Assistant Professor of Microbiology*
B.S. 1959, University of Washington; M.S. 1964, Ph.D. 1967, George Washington University

Francis Chucker, *Assistant Clinical Professor of Medicine*
M.D. 1957, Marquette University

Lloyd Eugene Church, *Associate Professorial Lecturer in Surgery (Oral Surgery)*
B.A. 1942, West Virginia University; D.D.S. 1944, University of Maryland; M.S. 1951, Ph.D. 1959, George Washington University

Judith Ann Fingert Chused, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1963, Wellesley College; M.D. 1967, Harvard University

Vichitur Chusuei, *Clinical Instructor in Child Health and Development*
M.D. 1962, Chulalongkorn University, Thailand

Attila Sakir Cigtay, *Assistant Clinical Professor of Radiology*
M.D. 1956, Istanbul University

Richard Francis Cioffi, *Assistant Clinical Professor of Medicine*
B.A. 1962, College of the Holy Cross; M.D. 1966, New Jersey College of Medicine

Roy Robert Cioletti, *Clinical Instructor in Child Health and Development*
B.A. 1966, Brown University; M.D. 1970, New Jersey College of Medicine

Hugh Gambel Clark, *Assistant Clinical Professor of Child Health and Development*
B.A. 1930, Howard Payne College; M.D. 1934, University of Texas Medical Branch at Galveston

Ross James Clark, *Special Lecturer in Obstetrics and Gynecology*
B.S. 1949, M.D. 1956, Howard University; M.S. 1951, University of New Hampshire

James McClay Close, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1951, Virginia Military Institute; M.D. 1955, University of Maryland

Charles Seymour Coakley, *Professor of Anesthesiology*
M.D. 1937, George Washington University

Joseph Henry Coenen, *Special Lecturer in Radiology*

George Joel Cohen, *Associate Clinical Professor of Child Health and Development*
M.D. 1950, George Washington University

Martin Herbert Cohen, *Assistant Professor of Medicine*
B.S. 1960, City University of New York, Queens College; M.D. 1964, New York University

Philip Cohen, *Assistant Professor of Medicine*
B.A. 1966, Columbia University; M.D. 1970, Harvard University

Victor Hugo Cohn, Jr., *Professor of Pharmacology*
B.S. 1952, Lehigh University; M.A. 1954, Harvard University; Ph.D. 1961, George Washington University

Miriam Lillian Cole, *Assistant Clinical Professor of Obstetrics and Gynecology (Nurse Midwifery)*
B.S. 1948, New York University; M.P.H. 1958, University of North Carolina at Chapel Hill

Allan Bertram Coleman, *Associate Clinical Professor of Child Health and Development*
M.D. 1943, George Washington University

Roy Melvin Coleman, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1952, Harvard University; M.D. 1959, University of Rochester

Richard Conant, *Clinical Instructor in Orthopaedic Surgery*
B.A. 1959, Rutgers University, New Brunswick; M.D. 1963, State University of New York Upstate Medical Center

Ridgely Glenn Conant, *Special Lecturer in Radiology*

Craig Cole Conboy, *Special Lecturer in Pathology*

Nathaniel Thomas Connally, *Clinical Instructor in Health Care Sciences and in Medicine*
B.A. 1958, M.D. 1962, University of Virginia

Thomas Martin Connor, *Clinical Instructor in Child Health and Development*
B.S. 1961, St. Francis College; M.D. 1966, University of Bologna

Louis Robert Conte, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1961, Johns Hopkins University

Charles Barrie Cook, *Associate Clinical Professor of Pathology*
B.S. 1945, Hampden-Sydney College; M.D. 1948, George Washington University

Thomas Alfred Cook, Jr., *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1949, University of Virginia

Stewart Dallas Cooley, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1957, Ohio State University; M.D. 1961, University of Cincinnati

Francis Donald Cooney, *Clinical Professor of Neurological Surgery*
B.S. 1959, King's College, Pennsylvania; M.D. 1963, University of Pittsburgh

William Hurlbert Cooper, *Clinical Professor of Obstetrics and Gynecology*
B.A. 1946, Case Western Reserve University; M.D. 1949, George Washington University

Francis Henry Corcoran, *Assistant Professor of Medicine*
M.D. 1962, St. Louis University

Paul Joseph Corso, *Instructor in Surgery*
B.A. 1966, M.D. 1969, George Washington University

Erminio Costa, *Professorial Lecturer in Pharmacology*
M.D. 1947, University of Cagliari, Italy

Ronald Michael Costell, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1962, M.A. 1967, M.D. 1967, Stanford University

Elaine Wolf Cotlove, *Clinical Instructor in Psychiatry and Behavioral Sciences*
B.A. 1942, Columbia University; M.D. 1944, New York University

Raymond Douglas Cotton, *Professorial Lecturer in Medical and Public Affairs*
B.A. 1965, Monmouth College, New Jersey; J.D. 1968, M.S. in Hygiene 1969, Harvard University

Gertrude Cotts, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1935, Friedrich Wilhelm University, Germany

Laurence Ari Cove, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1955, Columbia University; M.D. 1959, State University of New York Downstate Medical Center

Daniel David Cowell, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1956, University of Pennsylvania; M.D. 1960, Seton Hall University

Joel Reed Crabbe, *Special Lecturer in Pathology*
B.S. 1968, M.S. 1971, Texas A&M University

Eugene Fulton Crabtree, *Special Lecturer in Epidemiology and Environmental Health*

John Brown Craft, Jr., *Associate Professor of Anesthesiology and of Obstetrics and Gynecology*
B.A. 1959, Johns Hopkins University; M.D. 1963, Georgetown University

Louis Aleck Craig, Jr., *Assistant Clinical Professor of Medicine*
B.A. 1939, Georgetown University; M.D. 1943, Johns Hopkins University

Adelbert DeVere Cramer, *Associate Clinical Professor of Pathology (Blood Banking)*
B.S. in Ed. 1950, B.A. 1956, M.D. 1960, University of Kansas

Jeffrey Burke Crandall, *Assistant Professor of Health Care Sciences and of Medicine*
B.A. 1963, University of Rochester; M.D. 1967, Boston University

Neil Allan Crane, *Clinical Instructor in Medicine*
B.S.E. 1961, Princeton University; M.D. 1965, Washington University

Patrick Joseph Creaven, *Special Lecturer in Pharmacology*
M.B., B.S. 1956, Ph.D. 1964, University of London

Joseph Bernard Credle, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1961, M.D. 1966, University of North Carolina at Chapel Hill

Mabelle A. Cremer, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1948, Smith College; M.D. 1953, New York Medical College

Quintous Earl Crews, Jr., *Clinical Professor of Radiology*
M.D. 1955, University of Texas Medical Branch at Galveston

Elizabeth Amanda Crisp, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.S. 1943, Texas Woman's University; M.D. 1950, Louisiana State University Medical Center, New Orleans

Francis Joseph Crosson, Jr., *Clinical Instructor in Child Health and Development*
B.A. 1966, M.D. 1970, Georgetown University

Jack Crowell, *Assistant Clinical Professor of Medicine*
B.S. 1947, M.D. 1951, George Washington University

Brian Crowley, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1957, Yale University

Charles Deans Crystle, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.S. 1960, Franklin and Marshall College; M.D. 1964, University of Pennsylvania; M.S. 1969, Ohio State University

Leon Richard Culbertson, *Professor of Urology*
B.S., M.D. 1936, University of Virginia

Cecil Carleton Helmer Cullander, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1944, M.D. 1946, University of Wisconsin—Madison

Edward Earl Cunningham, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1952, Washington and Jefferson College; M.S. 1954, Duquesne University; M.D. 1960, George Washington University

James Allen Curtin, *Professor of Medicine*
B.A. 1946, Canisius College; M.D. 1950, State University of New York at Buffalo

Jahangir Cyrus, *Instructor in Medicine*
M.D. 1969, Tehran University

Leon Cytryn, *Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
M.D. 1951, University of Marburg

Carol Lynne Czerwinski, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1968, M.S. 1970, Marquette University; Ph.D. 1973, Georgetown University

Angelo D'Agostino, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1945, St. Michael's College; M.D. 1949, M.S. 1953, Tufts University

John William Dailey, *Assistant Professor of Pharmacology*
B.S. in Phar. 1966, University of Maryland; Ph.D. 1971, University of Virginia

Gordon Walford Daisley, Jr., *Clinical Instructor in Child Health and Development*
B.A. 1946, Dartmouth College; M.D. 1948, George Washington University

James Travis Dalton, *Assistant Professorial Lecturer in Epidemiology and Environmental Health*
B.S. in Gen.Std. 1969, George Washington University; M.S. 1970, United States Naval Postgraduate School

Abraham Wolffe Danish, *Associate Clinical Professor of Medicine*
B.A. 1938, M.D. 1941, George Washington University

Stuart Henry Danovitch, *Associate Clinical Professor of Medicine*
B.A. 1957, Harvard University; M.D. 1960, Northwestern University

Michael William Datch, *Clinical Instructor in Child Health and Development*
B.A. 1962, Washington and Jefferson College; M.D. 1966, George Washington University

Donald William Datlow, *Clinical Instructor in Medicine*
B.S. 1952, M.S. 1954, George Washington University; M.D. 1960, University of Maryland

William Davidson, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1947, M.S. 1948, M.D. 1953, Duke University

David Oliver Davis, *Professor of Radiology and of Neurology*
B.S. 1954, University of Illinois at Urbana-Champaign; M.D. 1958, St. Louis University

David Stanley Davis, *Assistant Clinical Professor of Medicine*
B.A. 1950, M.D. 1953, George Washington University

Donald Alan Davis, *Assistant Research Professor of Child Health and Development*
B.A. 1963, Pepperdine University; Ph.D. 1969, Vanderbilt University

Donald Irvin Davis, *Assistant Professor of Psychiatry and Behavioral Sciences*
B.A. 1964, Harvard University; M.D. 1968, University of Pennsylvania

Miryam Maltinskis Davis, *Assistant Clinical Professor of Neurology and of Child Health and Development*
M.D. 1957, University of Buenos Aires

David Davoudlarian, *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1959, Faculté Française de Médecine, Lebanon

Robert Day, *Assistant Clinical Professor of Ophthalmology*
B.A. 1936, Harvard University; M.D. 1943, Johns Hopkins University

Ayres D'Costa, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1952, Ed.M. 1954, University of Bombay; Ed.M. 1964, Ph.D. 1968, Ohio University

Robert Neal DeAngelis, *Clinical Instructor in Dermatology*
M.D. 1968, Medical College of Virginia of Virginia Commonwealth University

Rosalie Frances De Giovanni-Donnelly, *Assistant Research Professor of Microbiology*
B.A. 1947, M.A. 1953, City University of New York, Brooklyn College; Ph.D. 1961, Columbia University

Ronald Stuart Deitch, *Clinical Instructor in Ophthalmology*
B.A. 1954, Washington and Lee University; M.D. 1958, George Washington University

Anatole Stephen Dekaban, *Associate Clinical Professor of Neurology*
M.D. 1939, Warsaw University; M.S. 1951, Ph.D. 1954, McGill University

Donald William Delaney, *Professor of Child Health and Development*
B.S. 1949, St. Michael's College; M.D. 1954, Georgetown University

Morgan Dennis Delaney, *Instructor in Medicine*
B.A. 1967, M.D. 1971, University of Virginia

Armando Antonio de Moya, *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1960, Wake Forest University

William Charles Dempsey, *Assistant Clinical Professor of Surgery (Plastic)*
B.S. 1951, St. John's University, New York; M.D. 1955, State University of New York Downstate Medical Center

Elma Sitomer Denham, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1947, University of Wisconsin—Madison; M.S.W. 1952, University of Pennsylvania

Michael William Dennis, *Clinical Instructor in Neurological Surgery*
B.A. 1965, Brown University; M.D. 1969, Yale University

Ramesh Desai, *Research Instructor in Child Health and Development*
B.S. 1949, M.S. 1952, Ph.D. 1957, University of Bombay

Shekhar Rajeshwar Deshmukh, *Assistant Professor of Anesthesiology*
M.B.B.S. 1966, Nagpur Medical College, India; D.A. 1969, Royal College of Surgeons, London; F.F.A.R.C.S.I 1972, Royal College of Surgeons, Ireland

Gilbert Bryan Devey, *Associate Professorial Lecturer in Clinical Engineering*
B.S. 1946, Massachusetts Institute of Technology

Vincent Theodore DeVita, *Associate Professor of Medicine*
B.S. 1957, College of William and Mary; M.D. 1961, George Washington University

Herbert Harold Diamond, *Clinical Instructor in Child Health and Development*
M.D. 1936, George Washington University

Giovanni Di Chiro, *Clinical Professor of Neurological Surgery*
M.D. 1949, University of Naples

Robert Paul Dickey, *Clinical Instructor in Child Health and Development*
B.S. 1961, University of Minnesota Technical Institute; M.S. 1962, Massachusetts Institute of Technology; M.D. 1970, University of Minnesota

Kenneth James Dickie, *Assistant Professor of Medicine*
M.D. 1963, University of Toronto

Joseph San Miguel Dimapilis, *Special Lecturer in Epidemiology and Environmental Health*

Joseph Amedeo Di Paolo, *Associate Professorial Lecturer in Anatomy*
B.A. 1948, Wesleyan University; M.S. 1949, Case Western Reserve University; Ph.D. 1951, Northwestern University

Larry Dizmang, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1958, University of California, Berkeley; M.D. 1961, University of California, San Francisco

William Octavius Dobbins III, *Professor of Medicine*
M.D. 1957, University of Alabama in Birmingham

William Henry Dobbs, *Clinical Instructor in Psychiatry and Behavioral Sciences*
B.S. 1949, M.D. 1952, Emory University

Andrew Ivo Dobranski, *Assistant Clinical Professor of Orthopaedic Surgery*
M.D. 1954, Medical Academy of Warsaw

Oscar Irving Dodek, Jr., *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1956, University of Michigan; M.D. 1956, George Washington University

Herenia Isabel Osma Doerr, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1953, Indiana University

Karl Maximilian Doetsch, *Special Lecturer in Pathology*
BS. 1966, University of Richmond; M.P.H. 1970, University of North Carolina; M.S. 1974, Medical University of South Carolina

Michael Francis Dolan, *Associate Professor of Pathology (Hematology)*
B.S. 1953, Manhattan College; M.D. 1957, New York Medical College

Bill Murrie Domm, *Associate Professor of Medicine*
B.S. 1950, Texas Wesleyan College; M.D. 1951, University of Texas Medical School at Dallas

Howard Alexander Donald, *Associate Clinical Professor of Obstetrics and Gynecology*
M.D. 1939, George Washington University

Orville Wright Donnelly, *Associate Clinical Professor of Medicine*
B.A. 1943, Swarthmore College; M.S. 1951, M.D. 1957, George Washington University

Mark Donowitz, *Assistant Clinical Professor of Medicine*
B.A. 1964, Brandeis University; M.D. 1968, Johns Hopkins University

John Leo Doppman, *Clinical Professor of Radiology*
B.A. 1949, College of the Holy Cross; M.D. 1953, Yale University

Paul Austin Dorn, Jr., *Clinical Instructor in Ophthalmology*
B.A. 1953, St. Anselm's College; M.D. 1965, Georgetown University

Robert LeRoy Dow, *Associate Clinical Professor of Orthopaedic Surgery*
B.A. 1944, M.D. 1948, Cornell University

Spyros Doxiadis, *Visiting Professor of Child Health and Development*
M.B. 1940, M.D. 1943, University of Athens

Brian Bowles Doyle, *Assistant Professor of Psychiatry and Behavioral Sciences and of Health Care Sciences*
B.A. 1962, Harvard University; M.D., C.M. 1966, McGill University

George Dudas, *Assistant Clinical Professor of Urology*
M.D. 1952, University of Budapest

Michael Jean Duea, *Special Lecturer in Radiology*

Virginia Duggins, *Assistant Clinical Professor of Neurology*
B.A. 1942, Sweet Briar College; M.A. 1951, M.D. 1955, George Washington University

Burdett Sheridan Dunbar, *Associate Professor of Anesthesiology and of Child Health and Development*
B.S. 1960, M.D. 1963, University of Illinois at Urbana-Champaign

Rosalie Ann Dunn, *Assistant Research Professor of Clinical Engineering*
B.A. 1962, M.A. 1965, Ph.D. 1967, Catholic University of America

Robert DuPont, Jr., *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1958, Emory University; M.D. 1963, Harvard University

Robert Edward duPrey, *Assistant Clinical Professor of Ophthalmology*
B.S. 1942, Trinity College, Connecticut; M.D. 1945, Thomas Jefferson University

Jack Durell, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1949, Harvard University; M.D. 1953, Yale University

Thomas Patrick Dwyer, *Assistant Clinical Professor of Medicine*
B.S. 1954, Boston College; M.D. 1958, Tufts University

Robert Francis Dyer, *Assistant Clinical Professor of Medicine*
B.A. 1951, University of Michigan; M.D. 1955, George Washington University

Lawrence Joseph Eanet, *Assistant Clinical Professor of Dermatology*
B.A. 1952, Harvard University; M.D. 1956, George Washington University

Kenneth Martin Earle, *Professorial Lecturer in Neurology and in Neurological Surgery*
B.A. 1942, Rice University; M.D. 1945, University of Texas Medical Branch at Galveston; M.S. 1951, McGill University

Calvin Buddy Early, *Associate Professor of Neurological Surgery*
B.S. 1952, U.S. Coast Guard Academy; B.A. 1957, M.D. 1960, Ph.D. 1967, Ohio State University

William Charles Eckelman, *Associate Professor of Radiology*
B.S. 1963, St. Louis University; M.A. 1966, Ph.D. 1968, Washington University

Henry Dunlop Ecker, *Associate Clinical Professor of Medicine*
B.S. 1936, M.D. 1940, University of Virginia

George Themistocles Economos, *Assistant Clinical Professor of Medicine*
M.D. 1949, University of Athens; M.D. 1954, University of Vermont

Richard Nathan Edelson, *Clinical Instructor in Neurology*
B.A. 1963, Dartmouth College; M.D. 1966, Harvard University

David Eden, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1938, Cornell University; M.D. 1943, New York University

Mitchell Edson, *Associate Professor of Urology*
B.S. 1949, U.S. Merchant Marine Academy; M.A. 1952, Columbia University; M.D. 1956, Yale University

Gordon Stuart Edwards, *Assistant Professor of Pharmacology*
B.A. 1959, Amherst College; M.A. 1962, Harvard University; Sc.D. 1970, Massachusetts Institute of Technology

Maureen Crittenden Edwards, *Instructor in Child Health and Development*
B.S. 1966, Marquette University; M.D. 1970, George Washington University

Bernard Ehrlich, *Clinical Instructor in Ophthalmology*
B.S. 1952, M.B., B.Surg. 1956, Durham University

Wilfred Russell Ehrmantraut, *Assistant Clinical Professor of Medicine*
B.S. 1948, University of Maryland; M.D. 1952, George Washington University

Daniel Ein, *Associate Clinical Professor of Medicine*
B.A. 1959, Columbia University; M.D. 1964, Yeshiva University

Sanford Harold Eisenberg, *Assistant Clinical Professor of Orthopaedic Surgery*
M.D. 1942, State University of New York Downstate Medical Center

Mervyn Elgart, *Professor of Dermatology and of Child Health and Development*
B.A. 1953, City University of New York, Brooklyn College; M.D. 1957, Cornell University

Robert Cahoone Elliott, *Associate Professor of Medicine*
B.A. 1953, M.D. 1957, New York University

George Avery Ellsworth, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1965, Kansas State University; M.D. 1968, Harvard University

March Enders, *Assistant Professor of Medicine (Rehabilitation Medicine)*
B.A. 1951, Oberlin College; M.D. 1960, Yale University

Gloria Donna Eng, *Associate Professor of Child Health and Development and of Medicine*
M.D. 1955, Marquette University

Milton Engel, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1956, Harvard University; M.D. 1960, Yeshiva University

Susan Beth Engel, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1971, University of Massachusetts

William King Engel, *Clinical Professor of Neurology*
B.A. 1951, Johns Hopkins University; M.D. 1955, McGill University

Joseph Martin English III, *Special Lecturer in Child Health and Development*
B.S. 1964, M.D. 1968, Georgetown University

Joseph Thomas English, *Special Lecturer in Psychiatry and Behavioral Sciences*
B.A. 1954, St. Joseph's College, Pennsylvania; M.D. 1958, Thomas Jefferson University

William Francis Enos, *Assistant Clinical Professor of Pathology*
B.A. 1942, Dartmouth College; M.D. 1945, State University of New York Downstate Medical Center

Burton Seymour Epstein, *Professor of Anesthesiology and of Child Health and Development*
B.A. 1954, M.D. 1957, George Washington University

Julius Robert Epstein, *Assistant Clinical Professor of Obstetrics and Gynecology*
M.D. 1937, George Washington University

Stephen Epstein, *Assistant Clinical Professor of Otolaryngology*
B.A. 1960, New York University; M.D. 1964, University of Health Sciences/Chicago Medical School

James Bernard Erdmann, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1959, Pontifical College Josephinum; M.A. 1964, Ph.D. 1966, Loyola University of Chicago

Mary Frances Kelly Ericksen, *Special Lecturer in Anatomy*
B.A. 1947, Indiana University at Bloomington; M.A. 1957, Columbia University; Ph.D. 1973, George Washington University

Richard Vernon Erkenbeck, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.S. 1952, University of Maryland; M.D. 1956, George Washington University

Elaine Carol Esber, *Assistant Professor of Child Health and Development*
B.A. 1961, Kent State University; M.D. 1965, Ohio State University

James Lawrence Evans, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1957, Middlebury College; M.D. 1961, Thomas Jefferson University

John McCallum Evans, *Professor of Medicine*
B.A. 1935, Denison University; M.D. 1939, State University of New York at Buffalo

Richard Evans III, *Assistant Clinical Professor of Child Health and Development*
B.A. 1957, Colorado College; M.D. 1961, University of Colorado

Sergio Egidio Fabro, *Professor of Obstetrics and Gynecology*
M.D. 1956, University of Milan; Ph.D. 1966, Ph.D. 1968, University of Rome; Ph.D. 1967, University of London

David Nathaniel Fox Fairbanks, *Associate Clinical Professor of Otolaryngology*
B.S. 1960, M.D. 1963, University of Utah

Nancy Ellen Smolen Falk, *Clinical Instructor in Medicine*
B.A. 1967, University of Massachusetts; M.D. 1971, State University of New York Downstate Medical Center

Richard Jay Falk, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1962, M.S., M.D. 1966, University of Vermont

Larry Dean Faller, *Visiting Associate Professor of Biochemistry*
B.A. 1958, Wabash College; M.S. 1959, Ph.D. 1964, Yale University

Judith Catherine Fallon, *Instructor in Health Care Sciences and in Child Health and Development*
B.A. 1965, Regis College, Massachusetts; M.D. 1969, Medical College of Pennsylvania

Marion Dees Miller Faris, *Assistant Clinical Professor of Radiology*
B.A. 1943, Queens College, North Carolina; M.N. 1945, Case Western Reserve University; M.D. 1950, University of Virginia

John Anthony Farrell, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
M.B. 1940, M.D. 1941, Northwestern University

Philip Marshall Farrell, *Assistant Research Professor of Child Health and Development*
B.A. 1967, M.D., Ph.D. 1970, St. Louis University

Henry Leon Feffer, *Professor of Orthopaedic Surgery*
B.A. 1939, Indiana University at Bloomington; M.D. 1942, Indiana University at Indianapolis

James Joseph Feffer, *Professor of Medicine; Vice President for Medical Affairs*
B.A. 1935, Indiana University at Bloomington; M.D. 1938, Indiana University at Indianapolis

Carl Bruce Feinstein, *Clinical Instructor in Psychiatry and Behavioral Science and in Child Health and Development*
B.A. 1963, University of Chicago; M.D. 1968, State University of New York, Downstate Medical Center

Morris Feitel, *Clinical Professor of Child Health and Development*
M.D. 1957, George Washington University

Bruce Allen Feldman, *Clinical Instructor in Otolaryngology*
B.A. 1962, B.Med.S. 1963, Dartmouth College; M.D. 1965, Harvard University

Melvin Louis Feldman, *Clinical Instructor in Child Health and Development*
B.S. 1960, George Washington University; M.D. 1964, University of Vermont

William Robert Felts, Jr., *Associate Professor of Medicine*
B.S. 1944, M.D. 1946, University of Arkansas

Joseph Fenton, *Associate Clinical Professor of Medicine (Clinical Psychology)*
B.S. 1938, M.A. 1939, New York University; Ed.D. 1952, Columbia University

Leslie Howard Fenton, *Assistant Clinical Professor of Medicine*
M.D. 1959, University of London

Leon Ferber, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1933, Vanderbilt University; M.D. 1937, University of Tennessee Medical Units

Edward Egner Ferguson, *Clinical Professor of Urology*
M.D. 1936, George Washington University

William Ferguson, *Assistant Clinical Professor of Surgery*
B.S. 1932, Carson-Newman College; M.D. 1935, University of Tennessee Medical Units

Nirmala Khot Fernbach, *Assistant Professor of Neurology*
M.B.B.S. 1965, Manlan Azad Medical College, India; D.C.H. 1967, College of Physicians and Surgeons, India

Louis Earl Fettig, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1943, Pennsylvania State University; M.D. 1947, Hahnemann Medical College

Marc Fialco, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1961, Ohio University; M.D. 1965, University of Cincinnati

Annette Heiser Ficker, *Assistant Professor of Child Health and Development*
B.A. 1965, Trinity College, District of Columbia; M.D. 1969, St. Louis University

Stuart Michael Fidler, *Assistant Clinical Professor of Medicine*
B.A. 1963, Cornell University; M.D. 1967, State University of New York Upstate Medical Center

Jerry Wynn Filleman, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.A. 1968, M.S. 1972, Texas Technical University

Ben Sion Fine, *Associate Research Professor of Ophthalmology*
M.D. 1953, University of Toronto

James David Finkelstein, *Professor of Medicine*
B.A. 1954, Harvard University; M.D. 1958, Columbia University

Joseph LeRoy Firoved, *Special Lecturer in Radiology*

Max Fischer, *Associate Clinical Professor of Otolaryngology and of Child Health and Development*
M.D. 1946, Georgetown University

Robert Andrew Fischer, *Associate Clinical Professor of Medicine*
B.A. 1954, Columbia University; M.D. 1958, Cornell University

Salvatore Francis Fiscina, *Assistant Research Professor of Medical and Public Affairs; Director of the Student Health Service*
B.A. 1963, Harvard University; M.D. 1967, University of Rochester; J.D. 1973, George Washington University

Robert Lionel Fisher, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1963, M.D. 1967, University of Colorado

Susan Michal Fisher, *Special Lecturer in Child Health and Development and in Psychiatry and Behavioral Sciences*
B.S. 1959, University of Chicago; M.D. 1963, Columbia University

Donald Jay Fishman, *Associate Professor of Neurology and of Child Health and Development*
B.S. 1956, M.D. 1959, University of Illinois at Urbana-Champaign

Peter Harvey Fishman, *Lecturer in Biochemistry*
B.S. 1961, Massachusetts Institute of Technology; M.S. 1967, Ph.D. 1970, George Washington University

Marshall Duvall Fitz, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1963, Georgetown University; M.D. 1967, University of Missouri—Columbia

Alf Lee Fjordbotten, *Assistant Clinical Professor of Ophthalmology*
M.D. 1944, University of Alberta

Richard Leroy Flax, *Assistant Clinical Professor of Surgery*
B.S. 1962, M.D. 1966, University of Maryland

Edward Stitt Fleming, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1951, University of North Carolina at Chapel Hill; M.A. 1953, University of Texas at Austin; M.D. 1957, George Washington University

Anne Bosshard Fletcher, *Associate Professor of Child Health and Development*
B.A. 1960, Clark University; M.D. 1964, Washington University

Martin Jules Fliegelman, *Clinical Instructor in Medicine and in Health Care Sciences*
B.A. 1968, Franklin-Marshall College; M.D. 1972, Thomas Jefferson University

Gary Edward Flook, *Special Lecturer in Radiology*

Julius Fogel, *Assistant Clinical Professor of Obstetrics and Gynecology*
M.D. 1937, University of Virginia

Arlene Saunders Fonaroff, *Assistant Professorial Lecturer in Epidemiology and Environmental Health*
B.A. 1965, M.P.H. 1967, University of California, Los Angeles; M.Phil. 1972, Ph.D. 1973, George Washington University

Marvin Peace Footer, *Clinical Professor of Obstetrics and Gynecology*
B.A. 1938, M.D. 1942, George Washington University

Ulla M-Son Fortune, *Assistant Clinical Professor of Orthopaedic Surgery*
M.D. 1965, George Washington University

William Patrick Fortune, *Associate Professor of Orthopaedic Surgery and of Medicine*
B.S. 1953, Springfield College; M.D. 1965, George Washington University

Byron Earl Fossieck, Jr., *Assistant Professor of Medicine*
B.A. 1961, Drury College; M.D. 1965, Northwestern University

William Joseph Fouty, *Associate Professor of Surgery*
B.S. 1952, M.D. 1957, Ohio State University

John Leroy Fox, *Professor of Neurological Surgery*
M.D. 1959, George Washington University

Mary Alice Vann Fox, *Assistant Clinical Professor of Child Health and Development*
B.A. 1944, University of North Carolina at Greensboro; M.D. 1948, University of Pennsylvania

Mary Ruth Johns Fox, *Assistant Clinical Professor of Child Health and Development*
M.D. 1967, State University of New York Upstate Medical Center

Samuel Mickle Fox III, *Clinical Professor of Medicine*
B.A. 1944, Haverford College; M.D. 1947, University of Pennsylvania

David Hirsch Fram, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1959, Cornell University; M.D. 1963, Yale University

John Joseph Francis, *Associate Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1937, M.D. 1940, Vanderbilt University

Justin Arthur Frank, Jr., *Assistant Professor of Psychiatry and Behavioral Sciences*
B.A. 1964, University of California, Berkeley; M.D. 1968, University of Louisville

Randolph Adams Frank, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1946, M.D. 1948, Vanderbilt University

Bernard Leonard Frankel, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1963, City University of New York, City College; M.D. 1967, Yeshiva University

Calvin Jefferson Frederick, *Associate Clinical Professor of Psychiatry and Behavioral Sciences (Medical Psychology)*
B.F.A. 1940, University of Oklahoma; M.A. 1954, Ph.D. 1955, University of California, Los Angeles

Donald Sharp Fredrickson, *Special Lecturer in Medicine (Internal)*
B.S. 1946, M.D. 1949, University of Michigan

Frederick John Frensilli, *Associate Clinical Professor of Urology*
B.A. 1957, College of the Holy Cross; M.D. 1961, Georgetown University

Thomas Frey, *Clinical Instructor in Ophthalmology and in Child Health and Development*
B.A. 1955, M.D. 1958, Northwestern University

Adolph Friedman, *Assistant Clinical Professor of Medicine*
B.A. 1939, University of Pennsylvania; M.D. 1943, Thomas Jefferson University

Erwin Friedman, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
Ph.D. 1949, Pazmany Peter University, Hungary

Joseph Marshall Friedman, *Associate Clinical Professor of Obstetrics and Gynecology*
B.A. 1936, M.D. 1939, George Washington University

David Stern Friendly, *Associate Professor of Ophthalmology and of Child Health and Development*
B.A. 1954, Carleton College; M.D. 1958, Columbia University

Agnes Gordon Sampson Fry, *Research Instructor in Medicine*
B.S. 1943, Madison College

Marvin Fuchs, *Associate Clinical Professor of Medicine*
B.S. 1941, City University of New York, City College; M.D. 1944, New York University

Walter Edward Fulps, *Special Lecturer in Radiology*

Maurice Bennett Furlong, Jr., *Assistant Clinical Professor of Pathology (Laboratory Medicine)*
B.A. 1964, Fordham University; M.D. 1968, Harvard University

Matthew Henry Fusillo, *Assistant Professor of Pathology (Laboratory Medicine)*
B.S. 1948, University of Maryland; M.S. 1957, George Washington University

Gerardo Maniquiz Gacad, *Assistant Professor of Medicine*
M.D. 1965, University of Santo Tomas, Philippines

Richard Leo Gaertner, *Clinical Instructor in Orthopaedic Surgery*
B.S. 1961, Pennsylvania State University; M.D. 1965, Temple University

Edward Elias Gahres, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1950, Rutgers University, New Brunswick; M.S. 1951, George Washington University; M.D. 1958, University of Virginia

Dorothy Berlin Gail, *Assistant Research Professor of Medicine*
B.A. 1966, City University of New York, Hunter College; M.A. 1968, Boston University; Ph.D. 1973, Georgetown University

Linda Lou Gallo, *Assistant Research Professor of Biochemistry*
B.S. 1959, West Virginia University; M.S. 1963, Ph.D. 1969, George Washington University

David John Gardner, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1957, Atlantic Union College; M.D. 1961, Loma Linda University

Steve Michael Garman, *Special Lecturer in Pathology*

Floris Melbourne Garner, *Assistant Clinical Professor of Pathology (Comparative)*
B.S. 1948, D.V.M. 1950, Washington State University

Margaret Lucretia Garrett, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1952, Bucknell University; M.D. 1956, University of Pennsylvania

Ronald Devoe Gaskins, *Assistant Professor of Medicine*
B.S. 1958, College of Charleston; M.D. 1962, Medical University of South Carolina

Paul Theodore Gavaris, *Assistant Clinical Professor of Ophthalmology*
B.S. 1961, Rutgers University; M.D. 1968, George Washington University

William Gee, *Assistant Clinical Professor of Surgery*
M.D. 1961, State University of New York Downstate Medical Center

Byron Genner III, *Associate Clinical Professor of Orthopaedic Surgery*
M.D. 1954, State University of New York at Buffalo

Leon Paul Georges, *Assistant Professor of Medicine*
B.A. 1958, New York University; B.M.S. 1960, M.D. 1963, University of Geneva

Leon Gerber, *Associate Clinical Professor of Surgery*
M.D. 1936, George Washington University

Richard Borisow Gerber, *Assistant Professor of Psychiatry and Behavioral Sciences*
B.A. 1965, Amherst College; M.D. 1969, Harvard University

Peter Thomas Geueke, *Special Lecturer in Pathology*

Dorothy Mary Gibbons, *Instructor in Radiology (Nuclear Medicine)*

Sam Thompson Gibson, *Assistant Clinical Professor of Medicine*
B.S. 1936, Georgia Institute of Technoogy; M.D. 1940, Emory University

Charles Richard Alsop Gilbert, *Assistant Clinical Professor of Obstetrics and Gynecology*
M.D. 1944, University of Virginia

William Steven Gilbert, *Assistant Clinical Professor of Ophthalmology*
B.A. 1957, Cornell University; M.D. 1961, Yeshiva University

Martin Giller, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1962, M.D. 1966, Georgetown University

Allen Louis Ginsberg, *Assistant Professor of Medicine*
B.A. 1962, Princeton University; M.D. 1966, Johns Hopkins University

Stephen Paul Ginsberg, *Assistant Clinical Professor of Ophthalmology*
B.A. 1962, University of California, Los Angeles; M.D. 1966, University of California, San Francisco

Joseph Martin Giordano, *Assistant Clinical Professor of Surgery*
B.A. 1963, Georgetown University; M.D. 1967, Thomas Jefferson University

Milton Sanford Glatt, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1946, Johns Hopkins University; M.D. 1951, University of Geneva

Donald Henry Glew, Jr., *Associate Clinical Professor of Surgery*
B.S. 1945, Yale University; M.D. 1948, George Washington University

William Bainbridge Glew, *Assistant Clinical Professor of Ophthalmology*
B.S. 1950, Yale University; M.D. 1953, George Washington University; M.S. 1957, University of Minnesota

William Lloyd Glover, Jr., *Clinical Instructor in Urology*
B.S. 1962, University of Tennessee; M.D. 1965, University of Tennessee Medical Units

Edith Shirley Goode Godette, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1964, M.S. 1970, Howard University

Ira David Godwin, *Assistant Clinical Professor of Pathology*
B.S. 1952, M.D. 1955, University of North Carolina at Chapel Hill

Harvey Robert Gold, *Associate Clinical Professor of Child Health and Development*
B.A. 1956, Lafayette College; M.D. 1960, State University of New York Upstate Medical Center

Carl Goldberg, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences (Psychology)*
B.A. 1960, American International College; M.A. 1961, University of Wyoming; Ph.D. 1966, University of Oklahoma

Herbert Abraham Goldberg, *Associate Clinical Professor of Urology*
M.D. 1935, University of St. Andrews, Scotland

Marianne Rudolf Goldberger, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1953, Radcliffe College; M.D. 1958, New York University

Jerome Norman Goldman, *Assistant Clinical Professor of Ophthalmology*
B.A. 1951, University of Michigan; M.D. 1956, New York University

David Goldsmith, *Assistant Clinical Professor of Child Health and Development*
M.A. 1963, Hofstra University; M.D. 1968, New York University

Kenneth Goldstein, *Assistant Professor of Medicine*
B.A. 1962, Oberlin College; M.D. 1966, Case Western Reserve University

Louis Goldstein, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.S. 1934, M.B. 1936, M.D. 1937, University of Cincinnati

Norman Philip Goldstein, *Professorial Lecturer in Neurology*
B.A. 1941, New York University; M.A. 1942, M.D. 1946, George Washington University

Robert Arnold Goldstein, *Assistant Professor of Medicine*
B.A. 1962, Brandeis University; M.D. 1966, Thomas Jefferson University

Herbert Otto Goller, *Assistant Research Professor of Orthopaedic Surgery*
B.S. (M.E.) 1958, Stevens Institute of Technology; M.S. 1964, Ph.D. 1968, State University of New York at Buffalo

Herbert Stanley Golomb, *Clinical Instructor in Dermatology*
B.A. 1955, University of Pennsylvania; M.D. 1960, State University of New York Downstate Medical Center

Manuel Falcon Gonzales, *Assistant Professor of Anesthesiology*
M.D. 1959, University of Santo Tomas, Philippines

Nelinda Gonzalez, *Clinical Instructor in Medicine*
B.A. 1967, City University of New York—Hunter College; M.D. 1971, Georgetown University

Walter Yau Kwai Goo, *Assistant Clinical Professor of Medicine*
B.A. 1960, Harvard University; M.D. 1964, Case Western Reserve University

David John Goodenough, *Assistant Clinical Professor of Radiology (Radiation Physics)*
B.S. 1967, Ph.D. 1972, University of Chicago

David Henry Goodman, *Assistant Professor of Medicine*
B.A. 1959, University of Pennsylvania; M.D. 1963, George Washington University

Nelson Gates Goodman, *Clinical Instructor in Medicine*
B.A. 1950, M.D. 1954, Johns Hopkins University

Sam Leon Goodman, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1963, City University of New York, Brooklyn College; M.D. 1967, Yeshiva University

Richard Gordon, *Assistant Research Professor of Radiology*
B.S. 1963, University of Chicago; Ph.D. 1967, University of Oregon

Spencer Gordon, Jr., *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1952, Princeton University; M.D. 1956, Harvard University

Kenneth Paul Gorelick, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1962, Rutgers University, New Brunswick; M.D. 1967, Harvard University

Harvey Joel Gorfinkel, *Assistant Professor of Medicine*
M.D. 1965, University of Illinois at the Medical Center

Patrick Alan Gorman, *Associate Professor of Medicine*
M.B., Ch.B., B.A.O. 1954, Queens University, Ireland; D.C.H. 1956, University of London

Charles Mayo Goss, *Visiting Professor of Anatomy (Medical History)*
B.A. 1921, M.D. 1926, Yale University

Ernest Alva Gould, *Clinical Professor of Surgery*
B.S. 1936, University of Wyoming; M.D. 1939, George Washington University

Suresh Chandra Goyal, *Clinical Instructor in Child Health and Development*
B.S. 1956, Dr. in Ped. 1967, University of Lucknow, India; M.B., B.S. 1961, King George's Medical College, India

Bernard Grand, *Assistant Clinical Professor of Medicine*
B.A. 1958, Union College, New York; M.D. 1962, New York University

Carl Ralph Gray, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1957, Amherst College; M.D. 1962, Case Western Reserve University

Luther Wilson Gray, Jr., *Assistant Clinical Professor of Surgery*
B.A. 1961, University of Pennsylvania; M.D. 1966, George Washington University

Paul Gray, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1939, M.D. 1942, University of Chicago

Andrew Wesley Green, *Special Lecturer in Pathology*
B.S. 1970, Tuskegee Institute

Frederick Chapman Green, *Professor of Child Health and Development and of Health Care Sciences*
B.S. 1942, Indiana University at Bloomington; M.D. 1944, Indiana University at Indianapolis

Lennard Greenbaum, *Assistant Professor of Radiology*
B.S. 1966, Ursinus College; M.D. 1970, Temple University

Harold Abraham Greenberg, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1942, M.D. 1945, Temple University

Larrie Warren Greenberg, *Assistant Professor of Child Health and Development*
B.S. 1961, University of Toledo; M.D. 1965, Ohio State University

Robert Milton Greenberg, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1937, M.D. 1941, George Washington University

Mark Greene, *Clinical Instructor in Health Care Sciences and in Medicine*
B.A. 1966, Yale University; M.A. 1970, Tufts University

Albert Aaron Greenfield, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1961, American University; M.D. 1965, Howard University

Stanley Greenspan, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1962, Harvard University; M.D. 1966, Yale University

Tibor Jack Greenwalt, *Clinical Professor of Medicine*
B.A. 1934, M.D. 1937, New York University

Thomas Hamlin Gresinger, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1957, Williams College; M.D. 1961, George Washington University

Haikaz Martiros Grigorian, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1952, Boston University; M.S. in P.H. 1953, Columbia University; M.S. 1958, M.D. 1959, George Washington University

Jay Grodin, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1961, Hobart and William Smith Colleges; M.D. 1965, Thomas Jefferson University

David Grodsky, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1961, University of California, Los Angeles; M.D. 1965, University of California, Irvine

Robert Henry Groh, *Clinical Professor of Neurology*
B.S. 1935, M.D. 1937, University of Pittsburgh

Richard Lee Gross, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1956, Muhlenberg College; M.D. 1960, Hahnemann Medical College

Vincent Livingston Guandolo, *Assistant Clinical Professor of Child Health and Development*
B.A. 1953, Kenyon College; M.D. 1962, George Washington University

John Gregory Guccion, *Assistant Professor of Pathology*
B.A. 1958, John Carroll University; M.D. 1962, Georgetown University

Atin Guha, *Assistant Professor of Medicine*
M.D. 1962, Calcutta National Medical Institute

Grace Hughes Guin, *Associate Clinical Professor of Pathology*
B.S. 1938, Birmingham-Southern College; M.D. 1943, Vanderbilt University

Stephen Flack Gunther, *Assistant Professor of Orthopaedic Surgery*
B.A. 1963, Yale University; M.D. 1967, Union College and University

Michael Joel Guralnick, *Clinical Instructor in Child Health and Development (Psychology)*
B.A. 1962, University of Michigan; M.S. 1964, Ph.D. 1967, Lehigh University

Gordon Guroff, *Professorial Lecturer in Biochemistry*
B.S. 1954, University of Illinois at Urbana-Champaign; M.S. 1956, Auburn University; Ph.D. 1959, University of Wisconsin—Madison

Milton Gusack, *Clinical Professor of Medicine*
B.A. 1937, M.D. 1941, Johns Hopkins University

Margaret Frances Gutelius, *Associate Professor of Child Health and Development*
B.A. 1929, College of Wooster; M.D. 1938, Columbia University

Melvyn Robert Haas, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1960, University of Pennsylvania; M.D. 1964, Georgetown University

Stephen Samuel Haas, *Assistant Clinical Professor of Orthopaedic Surgery*
M.D. 1965, University of Oklahoma

Paul Adrian Haber, *Assistant Clinical Professor of Medicine*
B.A. 1941, University of Texas at Austin; M.A. 1942, Columbia University; M.D. 1949, University of Texas Medical Branch at Galveston; M.S. in P.A. 1968, George Washington University

Herbert Alfred Haessler, *Assistant Clinical Professor of Clinical Engineering*
B.S. 1950, University of Wisconsin—Madison; M.D. 1957, Marquette University

John Thomas Hagenbucher, *Assistant Clinical Professor of Medicine*
B.S. 1950, Philadelphia College of Pharmacy and Science; M.D. 1957, George Washington University

Fred Ernst Hahn, *Professorial Lecturer in Pharmacology*
Ph.D. 1948, University of Kiel

Riaz Haider, *Associate Research Professor of Medicine*
M.B., B.S. 1956, Panjab University, Pakistan; M.R.C.P. 1963, Royal College of Physicians, Edinburgh

Michael Joseph Halberstam, *Assistant Clinical Professor of Medicine*
B.A. 1953, Harvard University; M.D. 1957, Boston University

Wilson Luther Hall, *Assistant Clinical Professor of Medicine*
B.A. 1943, College of Wooster; M.D. 1947, George Washington University

Wilbur Albert Hamman, *Clinical Instructor in Psychiatry and Behavioral Sciences*
B.A. 1950, Occidental College; M.D. 1955, University of Chicago

Suzanne Dorothy Schubert Hammersberg, *Assistant Professor of Pathology (Medical Technology)*
B.S. 1957, University of Wisconsin—LaCrosse

Mary Kathryn Hammock, *Clinical Instructor in Neurological Surgery*
B.S. 1954, University of Miami; M.D. 1967, Northwestern University

Paul Hamosh, *Special Lecturer in Child Health and Development and in Psychiatry and Behavioral Sciences*
M.D. 1959, Hebrew University, Israel

Dennis John Hand, *Assistant Clinical Professor of Medicine*
M.D. 1960, University of Edinburgh

Philip Handler, *Distinguished Professor of Science*
B.S. 1936, City University of New York, City College; Ph.D. 1939, University of Illinois at Urbana-Champaign

Robert Gerald Hansen, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1970, University of Wisconsin at Oshkosh

Harold Cecil Harder, *Assistant Professor of Pharmacology*
B.S. 1964, Alma College, Michigan; M.S. 1966, Ph.D. 1970, Michigan State University

George White Hardman, Jr., *Assistant Clinical Professor of Child Health and Development*
B.A. 1954, M.D. 1958, Johns Hopkins University

Eugene Alexander Hargrove, *Professor of Psychiatry and Behavioral Sciences*
B.A. 1939, University of Texas at Austin; M.D. 1942, University of Texas Medical Branch at Galveston

Jerome Blaine Harrell, *Assistant Clinical Professor of Surgery*
M.D. 1936, George Washington University

Forest Klaire Harris II, *Assistant Clinical Professor of Medicine*
B.S. 1949, M.D. 1953, George Washington University

Clarence Richard Hartman, *Associate Professor of Epidemiology and Environmental Health*
B.A. 1933, M.D. 1936, George Washington University

Thomas Lees Hartman, *Assistant Clinical Professor of Medicine*
B.A. 1936, Muhlenberg College; M.A. 1938, University of Texas at Austin; M.D. 1943, Johns Hopkins University

Jack Wayne Harvey, *Clinical Instructor in Orthopaedic Surgery*
B.S. 1959, M.D. 1963, George Washington University

William Cushman Harvey, *Assistant Clinical Professor of Radiology*
B.A. 1957, University of Maine at Orono; M.D. 1962, Cornell University

William Herbert Harvey, *Assistant Clinical Professor of Medicine*
B.S. 1952, Wagner College; M.D. 1956, Albany Medical College of Union University

Kamel James Hassan, *Assistant Professor of Anesthesiology and of Child Health and Development*
B.S. 1948, College of the Holy Cross; M.D. 1952, Georgetown University

James Larrabee Hatleberg, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1949, University of Wisconsin—Madison; M.D. 1953, Marquette University

Donald David Haut, *Assistant Clinical Professor of Medicine*
B.A. 1954, Western Maryland College; M.D. 1958, Temple University

Michael Joel Haut, *Assistant Clinical Professor of Medicine*
B.A. 1963, Franklin and Marshall College; M.D. 1967, University of Pennsylvania

Thomas Cotton Havell II, *Clinical Instructor in Medicine*
B.A. 1963, Ohio Wesleyan University; M.D. 1967, Georgetown University

William John Hawes, *Assistant Clinical Professor of Neurology*
B.A. 1952, California State University, San Jose; M.D. 1960, University of California, San Francisco

George Joseph Hayes, *Clinical Professor of Neurological Surgery*
B.S. 1940, Catholic University of America; M.D. 1943, Johns Hopkins University

Murdock Head, *Airlie Professor of Medical and Public Affairs*
D.D.S. 1947, University of Louisville; M.D. 1953, University of Vermont; J.D. 1958, George Washington University

Robert John Heilen, *Clinical Instructor in Orthopaedic Surgery*
B.Ch.E. 1957, The Cooper Union; M.D. 1964, New York University

Dorothy Henderson Heilman, *Professorial Lecturer in Microbiology (Cellular Immunology)*
B.S. 1927, M.D. 1932, Northwestern University; M.S. 1940, University of Minnesota

George Baird Helfrich, *Assistant Clinical Professor of Surgery*
B.A. 1961, Denison University; M.D. 1965, University of Illinois at the Medical Center

Jack Heller, *Assistant Research Professor of Medical and Public Affairs*
B.A. 1952, University of Chicago; LL.B. 1958, Columbia University

Elson Bowman Helwig, *Clinical Professor of Pathology (Dermatologic)*
B.S. 1930, Indiana University at Bloomington; M.D. 1932, Indiana University at Indianapolis

Frederick Barrie Hendricks, *Assistant Clinical Professor of Urology*
B.A. 1958, DePauw University; M.D. 1962, Johns Hopkins University

David Carleton Hendrix, *Clinical Instructor in Pathology (Allied Health Science)*
B.S. in Engr. 1970, University of Michigan

John Clement Hergenrother, *Special Lecturer in Radiology*

Clifford Morris Herman, *Associate Professor of Surgery*
B.A. 1951, B.S. 1955, University of New Hampshire; M.D. 1959, University of Vermont

Monte Arnold Herman, *Clinical Instructor in Medicine*
B.A. 1956, M.D. 1959, George Washington University

Roy Hertz, *Research Professor of Pharmacology and of Obstetrics and Gynecology*
B.A. 1930, Ph.D. 1933, M.D. 1939, University of Wisconsin—Madison; M.P.H. 1940, Johns Hopkins University

Marc Hertzman, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1965, M.D. 1969, Harvard University

Helen Hope Hess, *Professor of Neurology and of Biochemistry*
B.A. 1946, B.S. 1948, West Virginia University; M.D. 1951, Harvard University

George Rothwell Hewlett, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.S. 1948, Dickinson College; M.D. 1953, Temple University

Jocelyn Muriel Bingley Hicks, *Assistant Professor of Child Health and Development and of Pathology*
B.S. 1959, M.S. 1962, University of London; Ph.D. 1971, Georgetown University

Robert Sexton Higdon, *Professor of Dermatology and of Child Health and Development*
B.S. 1933, Millsaps College; M.D. 1937, Tulane University of Louisiana

George Alfred Higgins, Jr., *Clinical Professor of Surgery*
B.S. 1938, University of New Mexico; M.D. 1942, Harvard University

Janet Lorelei Higgins, *Clinical Instructor in Pathology (Laboratory Medicine*
B.S. 1963, Rider College

Fred George Hilkert, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1951, Syracuse University; M.D. 1955, George Washington University

Robert Fuhr Hinckley, *Special Lecturer in Child Health and Development*
B.A. 1955, Bowdoin College; M.D. 1959, Tufts University

Benny Ray Hinton, *Special Lecturer in Pathology*
B.S. 1961, Louisiana State University

Robert Hirschfeld, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1964, Massachusetts Institute of Technology; M.D. 1968, University of Michigan; M.S. 1972, Stanford University

Howard Lee Hise, Jr., *Special Lecturer in Radiology*

Lawrence Bennett Hobson, *Associate Clinical Professor of Medicine*
B.A. 1935, University of Arkansas; Ph.D. 1941, University of Cincinnati

Robert Wayne Hobson II, *Assistant Professor of Surgery*
B.S. 1959, M.D. 1963, George Washington University

Cornelia Hoch-Ligeti, *Clinical Professor of Pathology*
M.D. 1931, University of Vienna

Leroy Edward Hoeck, *Clinical Professor of Child Health and Development*
M.D. 1937, University of Iowa

Howard Alan Hoffman, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1958, M.D. 1962, Case Western Reserve University

Julius Hoffman, *Special Lecturer in Psychiatry and Behavioral Sciences*
B.A. 1941, M.D. 1944, New York University; M.A. 1958, M.M.S. 1962, Ohio State University

Edward Eugene Hogg, *Special Lecturer in Pathology*

Sheldon Holen, *Clinical Instructor in Surgery (Periodontics)*
D.D.S. 1955, University of Maryland; M.P.H. 1962, Columbia University

Paul Vincent Holland, *Assistant Clinical Professor of Medicine*
B.A. 1958, University of California, Riverside; M.D. 1962, University of California, Los Angeles

Ariel Cahill Hollinshead, *Research Professor of Medicine (Pharmacology)*
B.A. 1951, Ohio University; M.A. 1955, Ph.D. 1957, George Washington University

Pearl Barbara Holly, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1929, City University of New York, Hunter College; M.S. 1934, M.D. 1938, New York University

Edward Charles Holscher, Jr., *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1961, Dartmouth College; M.D. 1965, University of Missouri

Paul Edison Horsey, *Special Lecturer in Radiology*

David Horwitz, *Assistant Clinical Professor of Medicine*
M.D. 1948, New York University

Norman Harold Horwitz, *Clinical Professor of Neurological Surgery*
B.A. 1945, Princeton University; M.D. 1948, Columbia University

John Candee Houck, *Professor of Child Health and Development (Biochemistry)*
B.A. 1953, Columbia University; M.S. 1955, Ph.D. 1956, University of Western Ontario

William Allen Howard, *Clinical Professor of Child Health and Development*
M.D. 1934, Tulane University of Louisiana

James Weldon Howell, *Assistant Clinical Professor of Pathology (Clinical Chemistry)*
B.S. 1957, Hardin-Simmons University; M.D. 1962, University of Texas Southwestern Medical School at Dallas.

Milford Kneal Howell, Jr., *Special Lecturer in Epidemiology and Environmental Health*

John Richard Howery, *Special Lecturer in Epidemiology and Environmental Health*

Irene I-Lieu Hsu, *Associate Professor of Medicine*
B.S. 1946, St. John's University, China; M.D. 1949, University of Vermont

Kun-yen Huang, *Associate Professor of Microbiology*
M.D. 1959, National Taiwan University; Ph.D. 1967, George Washington University

Richard Huberman, *Clinical Instructor in Ophthalmology*
B.S. 1959, City University of New York, City College; M.D. 1963, University of Health Sciences/Chicago Medical School

Charles Edwin Huckaba, *Adjunct Professor of Clinical Engineering*
B.E. 1944, Vanderbilt University; M.S. 1947, Massachusetts Institute of Technology; Ph.D. 1953, University of Cincinnati

Richard Myall Huffman, *Clinical Instructor in Medicine*
B.A. 1951, Haverford College; M.D. 1955, George Washington University

Rudolph Hugh, *Professor of Microbiology*
B.S. 1948, Michigan State University; Ph.D. 1954, Loyola University of Chicago

Violet Bowen Hugh, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1958, M.D. 1961, George Washington University

Roger Dale Hughes, *Clinical Instructor in Pathology*
B.S. 1966, East Tennessee State University

Evan Borroum Hume, *Clinical Instructor in Health Care Sciences*
M.D. 1929, Thomas Jefferson University

Wellington Hung, *Professor of Child Health and Development*
B.S. 1953, American University; M.D. 1957, George Washington University

Archer David Huott, *Assistant Clinical Professor of Neurology*
B.A. 1953, Seton Hall University; M.D. 1958, Marquette University

Francis Leo Hurley, *Assistant Professorial Lecturer in Epidemiology and Environmental Health (Biostatistics)*
B.S. 1966, Georgetown University; Ph.D. 1970, Johns Hopkins University

Arthur Proctor Hustead, *Associate Clinical Professor of Neurological Surgery*
B.S. 1949, M.D. 1952, Yale University

William Siti Nagib Ibrahim, *Clinical Instructor in Ophthalmology*
M.B., B.Ch. 1958, Alexandria University, Egypt

Virginia Grace Ingram, *Assistant Clinical Professor of Child Health and Development*
B.A. 1951, M.D. 1955, Case Western Reserve University

Vincent Michael Iovine, *Clinical Professor of Surgery*
B.S. 1931, Manhattan College; M.D. 1935, Columbia University

Nelson Sumner Irey, *Clinical Professor of Pathology*
B.S. 1935, M.D. 1938, University of Pittsburgh

Gilbert Raymond Irwin, *Assistant Clinical Professor of Medicine*
B.A. 1964, Seton Hall University; M.D. 1968, New Jersey College of Medicine

Daniel Isaacson, *Clinical Instructor in Otolaryngology*
B.A. 1955, University of New Mexico; M.D. 1964, University of Innsbruck

Norman Harry Isaacson, *Associate Clinical Professor of Surgery*
B.A. 1941, M.D. 1944, New York University

Francis Jackson, *Clinical Professor of Surgery*
B.A. 1939, Yale University; M.D. 1943, University of Virginia

Michael John Jackson, *Associate Professor of Physiology and Associate Research Professor of Medicine*
B.S. 1963, University of London; Ph.D. 1966, Sheffield University

Eugene Robert Jacobs, *Assistant Clinical Professor of Radiology*
B.A. 1951, Syracuse University; M.D. 1955, State University of New York Upstate Medical Center

Cecil Bryant Jacobson, *Assistant Professor of Obstetrics and Gynecology*
B.S. 1960, University of Utah; M.D. 1964, George Washington University

Marshall Hannis Jacobson, *Associate Clinical Professor of Medicine*
B.A. 1945, M.D. 1948, George Washington University

William Jerome Jacoby, Jr., *Professor of Medicine*
B.A. 1946, Emory University; M.D. 1950, Thomas Jefferson University

Louis Sidney Jaffe, *Associate Clinical Professor of Epidemiology and Environmental Health*
B.S. 1933, City University of New York, Brooklyn College; M.A. 1934, Columbia University

Irwin Sidney Jaffee, *Clinical Instructor in Otolaryngology*
B.A. 1952, New York University; M.D. 1956, State University of New York Downstate Medical Center

William James Jaffurs, *Associate Clinical Professor of Pathology*
B.S. 1948, Pennsylvania State University; M.D. 1952, Thomas Jefferson University

Bernard William Janicki, *Special Lecturer in Medicine*
B.A. 1953, M.A. 1955, University of Delaware; Ph.D. 1960, George Washington University

Frank Skiff Jannotta, *Associate Professor of Pathology*
B.A. 1951, Williams College; M.D. 1955, University of Pennsylvania

William Dabney Jarman, *Clinical Professor of Urology*
B.S. 1927, Hampden-Sydney College; M.D. 1932, University of Virginia

Hilliard Jason, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1953, McGill University; M.D. 1958, Ed.D. 1961, State University of New York at Buffalo

Melvin Jenkins, *Professorial Lecturer in Child Health and Development*
B.A. 1944, M.D. 1946, University of Kansas

Peter Fredrick Jensen, *Special Lecturer in Radiology*

Wallace Norup Jensen, *Eugene Meyer Professor of Medicine*
B.A. 1942, M.D. 1945, University of Utah

Dariel Lee Johnson, *Assistant Clinical Professor of Radiology (Nuclear Medicine Technology)*
B.S. 1962, Seattle Pacific College; M.D. 1966, University of Washington

Frank Bacchus Johnson, *Associate Clinical Professor of Pathology and Associate Professorial Lecturer in Forensic Sciences*
B.S. 1940, University of Michigan; M.D. 1944, Howard University

Frank Kenneth Johnson, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
B.A. 1938, Augustana College; M.D. 1942, University of Illinois Medical Center

Lent Clifton Johnson, *Special Lecturer in Pathology*
B.S. 1931, M.D. 1935, University of Chicago

Merrill Charles Johnson, *Assistant Clinical Professor of Radiology*
B.S. 1953, Dartmouth College; M.D. 1956, State University of New York at Buffalo; M.S. 1962, University of Rochester

Raymond Bernard Johnson, *Assistant Professor of Medicine*
B.A. 1959, Dartmouth College; M.D. 1963, Howard University

Thomas Nick Johnson, *Professor of Anatomy*
B.S. 1944, St. Ambrose College; M.S. 1949, Michigan State University; Ph.D. 1953, University of Michigan

Warren Charles Johnson, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1944, Seattle University; M.D. 1947, St. Louis University

Roger Earl Johnsonbaugh, *Assistant Professor of Child Health and Development*
B.A. 1956, Denison University; M.S. 1958, M.D. 1962, University of Cincinnati; Ph.D. 1973, University of North Carolina at Chapel Hill

Olga Garbarz Joly, *Assistant Professorial Lecturer in Epidemiology and Environmental Health*
D.D.S. 1945, University of Buenos Aires; Sc.D. 1970, Johns Hopkins University

Charles Wilson Jones, *Associate Clinical Professor of Medicine*
B.A. 1935, Johns Hopkins University; M.D. 1939, University of Maryland

Emory Eugene Jones, *Special Lecturer in Epidemiology and Environmental Health*

David Iglauer Joseph, *Clinical Instructor in Psychiatry and Behavioral Sciences*
B.A. 1963, Yale University; M.D. 1967, Case Western Reserve University

George Joseph, *Clinical Instructor in Child Health and Development*
B.S. 1957, University of Madras; M.B., B.S. 1962, Kerala University; M.P.H. 1969, Johns Hopkins University

William Lewis Joseph, *Associate Professor of Surgery*
B.A. 1958, Ohio University; M.D. 1962, Ohio State University

Kenneth Everett Joslyn, *Assistant Professor of Health Care Sciences and of Medicine*
B.A. 1965, Oberlin College; M.D. 1969, University of Rochester

John Kafka, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1944, Central YMCA Community College; M.S. 1947, University of Chicago; M.D. 1951, Emory University

Hayk Leon Kaftarian, *Clinical Instructor in Child Health and Development*
M.D. 1967, University of Tehran

Irwin Howard Kaiser, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1945, Brown University; M.D. 1948, New York Medical College

Paula Reines Kaiser, *Associate Professor of Anesthesiology*
M.B., Ch.B. 1936, University of St. Andrews, Scotland; M.D. 1937, State University of New York

Vicken Vahan Kalbian, *Clinical Instructor in Health Care Sciences*
B.A. 1944, M.D. 1949, American University of Beirut

Kanagaratnam Kanagalingam, *Research Instructor in Child Health and Development*
B.S. 1962, Ph.D. 1970, University of London

Naomi Kanof, *Special Lecturer in Dermatology*
B.A. 1931, M.D. 1934, George Washington University

Kenneth Lawrence Kaplan, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1957, B.S. 1958, M.D. 1962, University of Chicago

John Alexander Kark, *Assistant Clinical Professor of Medicine*
B.A., M.B. 1966, University of Oxford; M.D. 1969, Harvard University

Maya Tolani Karna, *Assistant Professor of Anesthesiology and of Child Health and Development*
M.B., B.S. 1961, M.G.M. Medical College, India

Ronald John Karpick, *Assistant Clinical Professor of Medicine*
B.A. 1961, University of Rochester; M.D. 1965, Yale University

Kenneth Graham Kassebaum, *Clinical Instructor in Child Health and Development*
B.A. 1956, Grinnell College; M.D. 1960, Northwestern University

*Edward Naim Kassira, *Associate Professor of Epidemiology and Environmental Health*
M.B., Ch.B. 1959, University of Baghdad; M.P.H. 1965, Johns Hopkins University; M.S. in Hygiene 1967, Harvard University; Ph.D. 1970, George Washington University

Karl Radley Katterjohn, *Instructor in Health Care Sciences*
B.A. 1974, Jacksonville University; B.S. 1974, George Washington University

Martin Katz, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1949, City University of New York, Brooklyn College; Ph.D. 1955, University of Texas at Austin

Sol Katz, *Special Lecturer in Medicine (Pulmonary Diseases)*
B.S. 1935, City University of New York, City College; M.D. 1939, Georgetown University

Jacob Joseph Katzow, *Assistant Professor of Psychiatry and Behavioral Sciences*
B.A. 1957, M.D. 1960, Stanford University

Morton Selwyn Kaufman, *Associate Clinical Professor of Obstetrics and Gynecology*
B.A. 1930, University of Michigan; M.D. 1934, University of Louisville

Richard Miles Kaufman, *Associate Clinical Professor of Medicine*
B.A. 1955, M.D. 1958, George Washington University

Ronald Paul Kaufman, *Professor of Medicine; Dean for Clinical Affairs of the Medical Center; Medical Director, University Hospital*
B.S. 1951, Trinity College, Connecticut; M.D. 1955, University of Pennsylvania

Morton Kavalier, *Clinical Instructor in Medicine*
B.A. 1965, University of Pennsylvania; M.D. 1969, Thomas Jefferson University

Frank James Kavanaugh, *Associate Research Professor of Medical and Public Affairs*
B.A. 1956, Lake Forest College

Charles Keck, *Clinical Professor of Orthopaedic Surgery*
B.A. 1949, M.D. 1953, Duke University

Christine Waples Kehne, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1942, Bryn Mawr College; M.D. 1949, Johns Hopkins University

* On administrative leave 1974–75.

Wilmer Deaver Kehne, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1942, Amherst College; M.D. 1945, Johns Hopkins University

Robert Keimowitz, *Associate Professor of Medicine and of Health Care Sciences; Assistant Dean for Admissions of the Medical Center; Director of Admissions (M.D. Program)*
B.A. 1961, M.S. 1963, M.D. 1965, University of Vermont

Daniel John Kelly, *Assistant Clinical Professor of Pathology*
B.A. 1962, Yale University; M.D. 1966, Thomas Jefferson University

George Archibald Kelser, Jr., *Professor of Medicine*
B.S. 1946, Harvard University; M.D. 1949, George Washington University

Bernard Kemp, *Professorial Lecturer in Clinical Engineering*
B.S. 1949, University of North Carolina at Chapel Hill; Ph.D. 1957, Vanderbilt University

Byron Atlas Kendall, *Special Lecturer in Radiology*

John Kenealy, *Assistant Clinical Professor of Urology*
B.A. 1948, Syracuse University; M.D. 1952, State University of New York Upstate Medical Center

Peter Ignatius Kenmore, *Professor of Orthopaedic Surgery*
M.D. 1947, Hahnemann Medical College

Marie-Louise Levy Kennedy, *Associate Professor of Anesthesiology*
B.S. 1943, College De Ville Franche, De Rouergue, France; M.D. 1952, Strasbourgh Medical School

John Andrew Kenney, Jr., *Special Lecturer in Child Health and Development and in Dermatology*
B.S. 1942, Bates College; M.D. 1945, Howard University

Richard Alec Kenney, *Professor of Physiology*
B.S. 1945, Ph.D. 1947, University of Birmingham

Stephen Gabriel Kent, *Associate Professor of Pathology*
B.A. 1956, M.D. 1960, Case Western Reserve University

James Michael Kerns, *Assistant Professor of Anatomy*
B.A. 1966, St. Olaf College; M.S. 1968, Ph.D. 1972, Purdue University

John Mark Keshishian, *Associate Clinical Professor of Surgery*
M.D. 1950, George Washington University

Israel Kessler, *Associate Clinical Professor of Medicine*
B.A. 1929, M.S. 1930, University of Pennsylvania; M.D. 1934, Temple University

Kenneth Kessler, *Clinical Instructor in Psychiatry and Behavioral Sciences*
B.A. 1965, M.D. 1969, Temple University

Harry Jay Kicherer, *Associate Clinical Professor of Radiology*
M.D. 1948, George Washington University

Hyun Wha Kim, *Associate Professor of Child Health and Development*
M.D. 1942, To-Ho University, Japan

Christina Eve Jensen Kimball, *Assistant Clinical Professor of Child Health and Development*
B.A. 1961, Wellesley College; M.D. 1965, University of Virginia

Phyllis Dawn Kind, *Associate Professor of Microbiology*
B.A. 1955, Montana State University; M.S. 1956, Ph.D. 1960, University of Michigan

George William Kindschi, *Assistant Clinical Professor of Pathology*
B.A. 1962, M.D. 1968, University of Wisconsin—Madison

John Harry King, Jr., *Clinical Professor of Ophthalmology*
B.S. 1932, M.D. 1934, Georgetown University

Joseph King, *Associate Clinical Professor of Medicine*
B.A. 1941, Princeton University; M.D. 1944, Johns Hopkins University

Lawrence Marion King, Jr., *Associate Clinical Professor of Ophthalmology*
B.A. 1948, Louisiana Tech University; M.D. 1953, Louisiana State University in New Orleans

Gideon Musyimi Kioko, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1964, University of Scranton; M.D. 1969, Meharry Medical College

Peter Thomas Kirchner, *Assistant Clinical Professor of Radiology*
B.A. 1960, Yale University; M.D. 1964, Columbia University

Leland Rose Kirkland, Jr., *Assistant Professor of Radiology*
B.S. 1965, Virginia Polytechnic Institute and State University; M.S. 1967, Emory University; Ph.D. 1971, Clemson University

Stanley Martin Kirson, *Assistant Clinical Professor of Surgery*
B.A., M.D., 1957, George Washington University

Stanley William Kirstein, *Associate Clinical Professor of Medicine*
B.A. 1939, M.D. 1943, George Washington University

Hans Joachim Klapproth, *Assistant Clinical Professor of Urology*
M.D. 1951, University of Hamburg

Gerald Klebanoff, *Associate Professor of Surgery*
B.A. 1952, New York University; M.D. 1956, University of Health Sciences/Chicago Medical School

Jack Kleh, *Associate Clinical Professor of Medicine*
B.A. 1942, M.D. 1944, George Washington University

Morris Kleinerman, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1929, City University of New York, City College; M.D. 1933, University of St. Andrews, Scotland

Calvin Trexler Klopp, *Warwick Professor of Surgery; Medical Director, University Clinic*
B.A. 1934, Swarthmore College; M.D. 1938, Harvard University

Philip Klubes, *Associate Professor of Pharmacology*
B.S. 1956, City University of New York, Queens College; M.S. 1959, Ph.D. 1962, University of Minnesota

Panpit Pansuwana Klug, *Assistant Professor of Medicine*
M.D. 1955, University of Medical Sciences, Thailand

David Michael Klym, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1971, LeMoyne College

Robert Glenn Knodell, *Assistant Clinical Professor of Medicine*
B.A. 1967, B.S. 1968, University of North Dakota; M.D. 1970, University of Pennsylvania

Stanley Marc Knoll, *Assistant Clinical Professor of Surgery*
B.S. 1964, University of Pittsburgh; M.D. 1968, University of Health Sciences/Chicago Medical School

Edward Graeme Koch, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1964, M.A. 1965, University of California, Los Angeles; M.D. 1969, George Washington University

Marilyn Jean Koering, *Associate Professor of Anatomy*
B.A. 1960, College of St. Scholastica; M.S. 1963, Ph.D. 1967, University of Wisconsin—Madison

Leonard Kogan, *Clinical Instructor in Ophthalmology*
M.D. 1957, University of Maryland

Saul Kalman Kolansky, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1959, Temple University; M.D. 1965, Georgetown University

Edward Ronald Kolvereid, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1956, Ohio University; M.D. 1960, Ohio State University

Wolfgang Theodor Koos, *Associate Clinical Professor of Neurological Surgery*
M.D. 1955, University of Vienna

Marvin Curtis Korengold, *Clinical Instructor in Neurology*
D.D.S. 1945, B.S. 1947, M.B. 1949, M.D. 1950, University of Minnesota

Bernardo Kotelanski, *Assistant Clinical Professor of Medicine*
M.D. 1964, University of Buenos Aires

Herbert Louis Kotz, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1953, M.D. 1956, George Washington University

Spiridon Koulouris, *Clinical Instructor in Neurological Surgery*
M.D. 1960, University of Salonika, Greece

Barton Kraff, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1961, University of Rochester; M.D. 1965, State University of New York at Buffalo

Norman Clifford Kramer, *Professor of Medicine*
B.S. 1948, The Citadel; M.S. 1950, M.D. 1954, George Washington University

Robert Kramer, *Clinical Instructor in Medicine*
B.A. 1949, Indiana University at Bloomington; M.D. 1956, University of Geneva

Malvin Donald Krinn, *Clinical Instructor in Ophthalmology*
M.D. 1965, University of Illinois at the Medical Center

Morris Edward Krucoff, *Assistant Clinical Professor of Otolaryngology*
B.S. 1937, M.D. 1942, George Washington University

Dean Krueger, *Research Professor of Statistics and Ophthalmology*
B.A. 1938, M.A. 1942, University of Chicago; M.S. 1959, Columbia University

Melba Burkholder Ksiazek, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1972, Indiana University of Pennsylvania

Lucas Kulczycki, *Special Lecturer in Child Health and Development*
B.S., D.V.M. 1936, University of Lwow; M.D. 1946, University of Edinburgh; D.P.H. 1948, University of London; D.C.H. 1950, Royal College of Physicians and Surgeons, England

William Kurstin, *Assistant Clinical Professor of Medicine*
B.S. 1941, M.D. 1943, George Washington University

Stephen Jay Kurzbard, *Assistant Professor of Radiology*
B.A. 1958, New York University; M.D. 1962, Yeshiva University

Edward Irving Kushner, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. in Med. 1947, University of Nebraska; M.D. 1949, New York Medical College

Jack Kushner, *Clinical Instructor in Neurological Surgery*
B.A. 1960, Tulane University of Louisiana; M.D. 1964, University of Alabama in Birmingham

William Thurston Lady, *Associate Clinical Professor of Obstetrics and Gynecology*
M.D. 1938, George Washington University

Barry Landau, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
B.A. 1963, Columbia University; M.D. 1966, New York University

Manuel Landman, *Assistant Clinical Professor of Dermatology*
B.S. 1933, M.D. 1941, George Washington University

Paul Allan Lange, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1963, M.D. 1967, University of Chicago

Leroy Lester Langley, *Special Lecturer in Physiology*
B.A. 1938, University of California, Los Angeles; M.A. 1939, Stanford University; Ph.D. 1942, Yale University; LL.B. 1954, Birmingham Law School

David Arthur Lanham, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1951, M.D. 1955, St. Louis University

David Lloyd Lanter, *Clinical Instructor in Ophthalmology*
B.S. 1959, City University of New York, Queens College; M.D. 1963, New York Medical College

Francis Gerald LaPiana, *Assistant Clinical Professor of Ophthalmology*
M.D. 1962, George Washington University

Joseph Charles La Porte, *Special Lecturer in Pathology*

John LaRosa, *Associate Professor of Medicine and of Health Care Sciences*
B.S. 1961, M.D. 1965, University of Pittsburgh

Harold Nickolai Larsen, *Special Lecturer in Epidemiology and Environmental Health*

Joseph Bruce Laskowski, *Special Lecturer in Epidemiology and Environmental Health*

William Day Lassek, *Clinical Instructor in Health Care Sciences and in Medicine*
B.A., M.D. 1968, Boston University

Donald Victor Lassiter, *Assistant Professorial Lecturer in Epidemiology and Environmental Health*
B.S. 1964, M.S. 1969, Ph.D. 1971, University of Oklahoma

Wilbur Darrell Latham, *Associate Clinical Professor of Surgery*
B.S. 1950, Mississippi College; M.D. 1953, Tulane University of Louisiana

John Wilmer Latimer, Jr., *Associate Clinical Professor of Medicine*
M.D. 1940, George Washington University

Henry Prather Laughlin, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1937, Ursinus College; M.D. 1941, Temple University

Robert Alan Lavine, *Assistant Professor of Physiology*
B.S. 1962, Ph.D. 1969, University of Chicago

Robert Leonard Lavine, *Assistant Clinical Professor of Medicine*
B.A. 1963, M.D. 1966, George Washington University

Stanford Lavine, *Assistant Clinical Professor of Orthopaedic Surgery*
B.A. 1950, M.D. 1954, University of Maryland

Charles Edward Law, Sr., *Assistant Clinical Professor of Medicine*
M.D. 1939, George Washington University

William Henry Lawrence, *Assistant Professor of Neurology*
B.A. 1960, Princeton University; M.D. 1964, Columbia University

Thomas Longley Lawson, *Associate Professor of Radiology*
M.D. 1965, University of Michigan

Arnold Albert Lear, *Associate Clinical Professor of Medicine*
M.D. 1950, Harvard University

Henry David Lederer, *Professorial Lecturer in Psychiatry and Behavioral Sciences*
B.S. 1934, M.D. 1937, University of Chicago

Martin Edward Lederman, *Clinical Instructor in Ophthalmology and in Child Health and Development*
B.A. 1960, City University of New York, Brooklyn College; M.D. 1964, Yeshiva University

Don Seung Lee, *Assistant Professor of Anesthesiology*
M.D. 1966, Catholic Medical College, Korea

James Alfred Lee, *Associate Professorial Lecturer in Epidemiology and Environmental Health*
B.S. 1949, Union College, New York; M.S. 1951, Cornell University; M.Phil. 1969, Ph.D. 1970, George Washington University

Sang Nam Lee, *Assistant Professor of Radiology*
M.D. 1965, Catholic Medical College, Korea

Son Taek Lee, *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1962, Seoul National University

Leonard Lefkowitz, *Assistant Clinical Professor of Child Health and Development*
B.A. 1957, Alfred University; M.D. 1962, University of Health Sciences/Chicago Medical School

Glenn Duane Legler, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1954, St. Olaf College; M.D. 1958, University of Wisconsin—Madison

Harold Bernard Lehrman, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1939, Bowdoin College; M.D. 1943, Tufts University

Sanford Leon Leikin, *Professor of Child Health and Development*
M.D. 1947, University of Louisville

Paul Reuben Lenz, *Assistant Clinical Professor of Medicine*
B.S. 1954, M.D. 1960, Hebrew University, Israel

Edward Joseph Leonard, *Associate Clinical Professor of Medicine*
M.D. 1949, Harvard University

Fred Leonard, *Research Professor of Medicine (Rehabilitation Medicine) and of Orthopaedic Surgery; Associate Dean for Research of the Medical Center*
B.S. 1938, University of Arkansas; M.S. 1942, Ph.D. 1947, Polytechnic Institute of Brooklyn

Edwin Milton Lerner II, *Research Professor of Microbiology*
B.A. 1941, M.D. 1944, Harvard University

May Siang Lim Lesar, *Assistant Clinical Professor of Radiology*
M.D. 1966, Wayne State University

Bruce Edward Lessin, *Clinical Instructor in Medicine*
B.S. 1964, University of Wisconsin; M.D. 1967, University of Michigan

Lawrence Stephen Lessin, *Professor of Medicine and of Pathology*
M.D. 1962, University of Chicago

Gordon Sparks Letterman, *Professor of Surgery*
B.A. 1937, B.S. in Med.Sc. 1940, M.D. 1941, Washington University

Ian Leverton, *Adjunct Assistant Professor of Anatomy*
M.B., B.S. 1970, University of London; M.R.C.S., L.R.C.P. 1970, Royal College of Physicians and Surgeons, England

L. David Levi, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1960, Harvard University; M.D. 1964, Cornell University

Sheldon Levin, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1971, University of Maryland

Jack Louis Levine, *Assistant Clinical Professor of Otolaryngology and of Child Health and Development*
M.D. 1938, George Washington University

William Lewis, *Assistant Clinical Professor of Medicine*
M.D. 1941, George Washington University

Robert Todd Lewit, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1959, M.D. 1963, Harvard University

Choh Luh Li, *Clinical Professor of Neurological Surgery*
M.D. 1942, National Medical College of Shanghai; M.S. 1950, Ph.D. 1954, McGill University

Manfred Wilhelm Lichtmann, *Assistant Clinical Professor of Anesthesiology*
B.S. 1954, Wagner College; M.D. 1963, Thomas Jefferson University

Joseph Lindsay, Jr., *Professor of Medicine*
B.S. 1954, Clemson University; M.D. 1958, Emory University

Ralph Burgess Lingeman, *Associate Professor of Pathology*
M.D. 1953, Indiana University at Bloomington

Daniel Gordon Lipman, *Clinical Instructor in Psychiatry and Behavioral Sciences*
M.D. 1940, Middlesex Hospital Medical School, England

William Herman Lipshutz, *Assistant Professor of Medicine*
B.A. 1963, Swarthmore College; M.D. 1967, University of Pennsylvania

Steven Howard Lipsius, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1962, St. Joseph's College, Pennsylvania; M.D. 1963, M.A. 1965, Temple University

George Liss, *Clinical Instructor in Ophthalmology*
B.A. 1955, M.D. 1958, George Washington University; M.S. 1964, Marquette University

Christopher Roland Lissner, *Clinical Instructor in Pathology (Clinical Microbiology)*
B.S. 1970, M.S. 1972, University of Southern California

Chia Ching Liu, *Clinical Instructor in Orthopaedic Surgery*
M.D. 1957, National Taiwan University

Leon McNeely Liverett, *Associate Clinical Professor of Obstetrics and Gynecology*
B.S. 1943, Butler University; M.D. 1945, Indiana University at Indianapolis

John Hayes Lodge, *Assistant Clinical Professor of Ophthalmology*
B.A. 1947, West Virginia University; M.D. 1951, Johns Hopkins University

Robert Loeffler, *Clinical Instructor in Orthopaedic Surgery*
B.S. 1963, Columbia University; M.D. 1967, Yeshiva University

Billy Ray Long, *Special Lecturer in Epidemiology and Environmental Health*

James Walling Long, *Assistant Clinical Professor of Medicine*
M.D. 1943, George Washington University

Carl Douglas Lord, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1962, Columbia Union College; M.D. 1966, Loma Linda University

Samuel Dennis Loube, *Clinical Professor of Medicine*
B.A. 1941, M.D. 1943, George Washington University

John Andrew Lowe, *Clinical Instructor in Child Health and Development*
B.A. 1964, Harvard University; M.D. 1968, Tufts University

William Byron Lowe, *Special Lecturer in Radiology*

Philip Lowenthal, *Assistant Clinical Professor of Anesthesiology*
B.S. 1935, M.D. 1938, University of Oklahoma

Jean Pitner Lucas, *Assistant Clinical Professor of Medicine*
B.A. 1944, B.S. 1946, University of Mississippi; M.D. 1948, George Washington University

William Matthew Lukash, *Professor of Medicine*
B.S. 1952, Michigan State University; M.D. 1956, University of Michigan

James Lindsay Luke, *Clinical Professor of Pathology (Forensic)*
B.S. 1956, Columbia University; M.D. 1960, Case Western Reserve University

Robert John Lull, *Assistant Clinical Professor of Radiology*
B.A. 1962, Canisius College; M.D. 1966, Albany Medical College of Union University

John William Lyles, *Clinical Instructor in Obstetrics and Gynecology*
B.M.E. 1954, Cornell University; M.D. 1970, George Washington University

Carl Charles MacCartee, Jr., *Clinical Instructor in Orthopaedic Surgery*
B.A. 1963, Duke University; M.D. 1967, Georgetown University

Thayer Mills Mackenzie, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1944, Harvard University; M.D. 1947, Johns Hopkins University

Thomas Archie MacLean, *Clinical Instructor in Urology*
B.S. 1960, Boston College; M.D. 1964, Boston University

Ivan Vasil Magal, *Clinical Instructor in Medicine*
Th.B. 1944, Baptist Theological Seminary, Hungary; B.A. 1948, Eastern Mennonite College; B.S. 1949, Lebanon Valley College; M.D. 1954, Medical College of Virginia of Virginia Commonwealth University

Csaba Ladislo Magassy, *Clinical Instructor in Surgery*
B.S. 1958, M.D. 1962, Creighton University

Iradj Mahdavi, *Associate Clinical Professor of Child Health and Development*
M.D. 1956, University of Tehran

John Gail Maier, *Professor of Radiology and of Obstetrics and Gynecology*
M.D. 1952, St. Louis University; M.S. 1959, University of Colorado; Ph.D. 1963, University of Rochester

Maxwell Sherwood Maillis, *Assistant Clinical Professor of Medicine*
B.S. 1961, M.D. 1965, University of Chicago

Massoud Majd, *Associate Professor of Radiology and of Child Health and Development*
M.D. 1960, University of Tehran

Jocelyn Ruth Schoen Malkin, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1947, Columbia University; M.D. 1952, Yale University

Kalisankar Mallik, *Assistant Research Professor of Medicine*
B.S. 1959, B.Tech. 1961, M.Tech. 1962, Calcutta University; M.S. 1969, George Washington University

William Mallin, *Assistant Clinical Professor of Medicine*
M.D. 1967, Temple University

Zenina Wanda Zagula Mally, *Special Lecturer in Dermatology*
M.D. 1958, University of Toronto

Richard Axel Malmgren, *Clinical Professor of Pathology*
B.S. 1942, Wagner College; M.D. 1945, Cornell University

Michael Joseph Malone, *Professor of Neurology and of Child Health and Development*
B.A. 1951, Boston College; M.D. 1956, Georgetown University

Bayani Lipana Manalo, *Assistant Clinical Professor of Medicine*
B.A. 1962, M.D. 1967, University of the Philippines

Benjamin Manchester, *Clinical Professor of Medicine*
M.D. 1935, George Washington University

Harold George Mandel, *Professor of Pharmacology*
B.S. 1944, Ph.D. 1949, Yale University

Harry Armstrong Mangold, *Assistant Professor of Child Health and Development*
B.A. 1950, College of Wooster; B.D. 1953, McCormick Theological Seminary; M.D. 1964, University of Cincinnati

Dertad Manguikian, *Assistant Professor of Ophthalmology*
B.S. 1962, M.D. 1966, American University of Beirut

Hildegard Wessel Manitsas, *Assistant Clinical Professor of Anesthesiology*
M.D. 1951, Free University of Berlin

Donald Henry Manley, *Special Lecturer in Radiology*

James Packard Mann, *Associate Clinical Professor of Medicine*
M.D. 1947, George Washington University

*Emanuele Mannarino, *Assistant Professor of Neurological Surgery*
M.D. 1951, University of Rome; M.D. 1963, Duke University

Nicholas Emmanuel Manos, *Assistant Professorial Lecturer in Epidemiology and Environmental Health*
B.A. 1938, University of California, Berkeley; M.A. 1942, University of California, Davis

John Allen Maples, *Special Lecturer in Pathology*
B.A. 1966, Northwestern University; B.S. 1967, Concord College

Allen Elias Marans, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
M.D. 1949, Georgetown University

John Paul Marceau, *Special Lecturer in Epidemiology and Environmental Health*

Andrew Menges Margileth, *Professor of Child Health and Development*
B.A. 1942, Washington and Jefferson College; B.S. 1944, Massachusetts Institute of Technology; M.D. 1947, University of Cincinnati

David Mervyn Margulies, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1956, Columbia University; M.D. 1961, Northwestern University

Irwin Henley Marill, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1950, Brown University; M.D. 1954, Hahnemann Medical College

Alfred Francis Marin, *Special Lecturer in Epidemiology and Environmental Health*

Stanley Marinoff, *Associate Professor of Obstetrics and Gynecology and of Health Care Sciences*
B.A. 1958, University of Pennsylvania; M.D. 1962, University of Health Sciences/Chicago Medical School; M.P.H. 1970, Harvard University

Henry Brandis Marsh, *Assistant Professor of Medicine (Cardiology)*
B.A. 1962, Harvard University; M.D. 1966, Johns Hopkins University

William Laverne Marsh, *Associate Professor of Pathology and of Anesthesiology*
B.S. 1942, Purdue University; M.D. 1946, State University of New York at Buffalo

Daniel John Marsick, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.A. 1969, Case Western Reserve University

* On leave of absence, 1974–75.

Vernon Edward Martens, *Associate Clinical Professor of Pathology*
B.S. 1935, M.D. 1937, St. Louis University

Clifford Ross Martin, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.A. 1971, California State University at San Jose

Dean Harrington Martin, *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1950, George Washington University

Donald Gene Martin, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1962, M.S. 1965, Idaho State University

Shirley Sue Martin, *Associate Clinical Professor of Obstetrics and Gynecology*
B.A. 1940, Marshall University; M.D. 1943, Medical College of Virginia of Virginia Commonwealth University

Albert Nicholas Martins, *Associate Clinical Professor of Neurological Surgery*
B.S. 1953, M.S. 1956, Fordham University; M.D. 1960, State University of New York Downstate Medical Center

Donald John Massaro, *Professor of Medicine*
B.A. 1953, Hofstra University; M.D. 1957, Georgetown University

Gloria DeCarlo Massaro, *Associate Research Professor of Medicine (Pulmonary Diseases)*
B.S. 1953, College of Mount St. Vincent; M.D. 1957, Georgetown University

Aniello Francis Mastellone, *Associate Professor of Medicine (Physical Medicine)*
B.S. 1931, Manhattan College; M.D. 1935, George Washington University

Nina Woo Matheson, *Assistant Research Professor of Medical and Public Affairs*
B.A. 1956, M.L. 1958, University of Washington

Mary Jean Matthews, *Professor of Pathology*
B.A. 1946, M.D. 1949, George Washington University

Paul Mazel, *Professor of Pharmacology and of Anesthesiology*
B.S. 1946, Medical College of Virginia of Virginia Commonwealth University; M.S. 1955, Trinity University; Ph.D. 1960, Vanderbilt University

Harry Moses McAllister, *Clinical Instructor in Ophthalmology*
B.A. 1936, University of Georgia; M.D. 1949, Johns Hopkins University

Michael McCally, *Associate Professor of Health Care Sciences and of Physiology; Associate Dean for Allied Health Programs of the Medical Center*
B.A. 1956, Princeton University; M.D. 1960, Case Western Reserve University; Ph.D. 1970, Ohio State University

James Edward McClenathan, *Professor of Surgery and of Child Health and Development*
B.A. 1943, Washington and Jefferson College; M.D. 1947, University of Pittsburgh

Bruce Lincoln McClennan, *Assistant Professor of Radiology*
B.S. 1963, Union College, New York; M.D. 1967, State University of New York Upstate Medical Center

Hugh Bernard McCormick, *Assistant Professor of Medicine*
B.A. 1963, College of the Holy Cross; M.D. 1967, New Jersey College of Medicine

Stephen Laurence McCourt, *Special Lecturer in Epidemiology and Environmental Health*

Mary Jacobs McCrea, *Assistant Research Professor of Ophthalmology and of Physiology*
B.A. 1964, Trinity College, District of Columbia; M.S. 1966, Ph.D. 1969, University of Illinois at Urbana-Champaign

William Stanley McCune, *Clinical Professor of Surgery*
B.A. 1931, Swarthmore College; M.D. 1935, Harvard University

William Stran McCurley, *Assistant Professor of Child Health and Development*
B.S. 1959, Villanova University; M.D. 1963, Hahnemann Medical College

Charles Walter McCutchen, *Assistant Clinical Professor of Orthopaedic Surgery (Biomechanics)*
B.A. 1950, Princeton University; M.S. 1952, Brown University; Ph.D. 1957, University of Cambridge

Ross Albert McElroy, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1957, University of Texas at Austin; M.D. 1961, University of Texas Medical Branch at Galveston

James Jerry McFarland, Jr., *Associate Clinical Professor of Otolaryngology and of Child Health and Development*
B.S. 1935, Cumberland College of Tennessee; M.D. 1938, University of Tennessee Medical Units

James Michael McGinnis, *Clinical Instructor in Health Care Sciences and in Medicine*
B.A. 1966, University of California, Berkeley; M.A., M.D. 1971, University of California, Los Angeles

Larry McGowan, *Associate Professor of Obstetrics and Gynecology*
B.S. 1950, Millikin University; B.S. in Med. 1952, M.D. 1954, University of Illinois at the Medical Center

Lawrence Edward McGuire, *Special Lecturer in Epidemiology and Environmental Health*

Brady Piersol McKaig, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1957, University of Notre Dame; M.D. 1961, Cornell University

Douglas William McKay, *Professor of Orthopaedic Surgery and of Child Health and Development*
B.A. 1951, University of Maine at Orono; M.D. 1955, Tufts University

William Prentiss McKelway, *Clinical Professor of Obstetrics and Gynecology*
B.A. 1943, Washington and Lee University; M.D. 1950, George Washington University

Donald Harrison McKnew, Jr., *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1955, Yale University; M.D. 1961, Johns Hopkins University

Vincent L. McManaman, *Assistant Clinical Professor of Radiology*
B.S. 1963, Saint Joseph's College, Pennsylvania; M.S. 1965, University of Notre Dame; Ph.D 1971, Purdue University

John Johnson McMillan, *Associate Professor of Psychiatry and Behavioral Sciences (Psychology)*
B.A. 1943, Wake Forest University; M.A. 1948, Ph.D. 1951, Duke University

William James McSweeney, *Professor of Radiology and of Child Health and Development*
B.S. 1957, College of the Holy Cross; M.D. 1961, University of Vermont

John English McWhorter IV, *Assistant Professor of Medicine*
B.A. 1964, Williams College; M.D. 1968, New Jersey College of Medicine

Donald Chamberlin Meek, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1957, Ohio Wesleyan University; M.D. 1961, Ohio State University

John Edmond Meeks, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1954, Hendrix College; M.D. 1957, University of Tennessee Medical Units

Dale Richard Meers, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1950, University of Washington; M.S.W. 1956, University of Minnesota

Gordon Weed Mella, *Assistant Clinical Professor of Child Health and Development*
B.S. 1953, Ursinus College; M.D. 1956, Thomas Jefferson University

William Francis Mellen, *Special Lecturer in Radiology*

Milton Meltzer, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1943, M.D. 1946, Ohio State University

Robert Seaman Melville, *Clinical Professor of Pathology (Laboratory Medicine)*
B.A. 1932, Clark University; Ph.D. 1950, University of Iowa

Robert Allen Mendelsohn, *Clinical Instructor in Neurological Surgery*
M.D. 1949, Georgetown University

Sander Holstein Mendelson, *Assistant Professor of Medicine*
B.A. 1956, Wesleyan University; M.D. 1960, New York University

Nicholas Mendjuk, *Clinical Instructor in Medicine*
M.D. 1964, University of Madrid

Jean Hugues Menetrez, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1942, University of Besançon, France; M.D. 1950, McGill University

Maurice Mensh, *Associate Clinical Professor of Medicine*
M.D. 1939, George Washington University

John Frederick Mermel, *Assistant Clinical Professor of Medicine*
B.S. 1956, Georgetown University; M.D. 1960, George Washington University

Carl Ronald Merril, *Professorial Lecturer in Biochemistry*
B.S. 1958, College of William and Mary; M.D. 1962, Georgetown University

Alfred Michael Messore, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1956, Mount St. Mary's College, Maryland; M.D. 1961, State University of New York at Buffalo

Jerry Francis Meyer, *Assistant Professor of Medicine*
M.D. 1963, University of Chicago

Frederick Meyers, *Assistant Clinical Professor of Medicine*
B.S. 1955, Purdue University; M.D. 1959, University of Cincinnati

Herman Arnold Meyersburg, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1933, M.D. 1938, New York University

Morris Irwin Michael, *Special Lecturer in Child Health and Development*
B.A. 1938, Cornell University; M.D. 1942, George Washington University

Lyle Joseph Micheli, *Assistant Clinical Professor of Orthopaedic Surgery*
B.A. 1962, M.D. 1966, Harvard University

Frank Murray Midgley, *Assistant Professor of Surgery and of Child Health and Development*
B.A. 1961, Princeton University; M.D. 1965, Albany Medical College of Union University

Harvey Franklin Midkiff, *Special Lecturer in Radiology*

Louis Rimvydas Milavickas, *Assistant Clinical Professor of Radiology*
B.A. 1968, St. Mary's College, Minnesota; M.S. 1970, University of Tennessee at Knoxville

Thomas Herrick Milhorat, *Professor of Neurological Surgery and of Child Health and Development*
B.S. 1957, M.D. 1961, Cornell University

Hilary Ethel Clara Millar, *Clinical Instructor in Child Health and Development (Psychiatry)*
M.D. 1947, Royal College of Surgeons, Scotland; M.P.H. 1958, Johns Hopkins University

Jack William Millar, *Vivian Gill Professor of Epidemiology and Environmental Health*
B.A. 1945, Stanford University; M.D. 1947, George Washington University; M.P.H. 1951, M.S. in Hygiene and Tropical Medicine 1952, Harvard University

Celesta Ann Miller, *Special Lecturer in Pathology*

Frank Nelson Miller, Jr., *Professor of Pathology*
B.S. 1943, M.D. 1948, George Washington University

George Francis Miller, Jr., *Clinical Instructor in Otolaryngology*
M.D. 1958, George Washington University

Harry Charles Miller, Jr., *Professor of Urology*
B.A. 1950, Amherst College; M.D. 1954, Yale University

Harry Philip Miller, *Special Lecturer in Epidemiology and Environmental Health*

Valery Thornton Miller, *Clinical Instructor in Health Care Sciences and in Medicine*
B.A. 1958, M.D. 1961, George Washington University

Dorothy Friedlander Millon, *Clinical Instructor in Medicine*
B.A. 1946, M.A. 1948, University of California, Los Angeles; M.D. 1955, University of Chicago

Mitchell Mills, *Professor of Surgery*
B.A. 1952, Princeton University; M.D. 1956, Cornell University

Irvin Donald Milowe, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
B.A. 1953, Columbia University; M.D. 1957, Cornell University

Harvey Nelson Mininberg, *Clinical Instructor in Orthopaedic Surgery*
B.A. 1960, Brandeis University; M.D. 1965, Yeshiva University

Harold Stanley Mirsky, *Assistant Clinical Professor of Medicine*
B.S. 1959, City University of New York, Brooklyn College; M.D. 1964, State University of New York Upstate Medical Center

Donald Mitchell, *Assistant Clinical Professor of Dermatology*
B.S. 1954, M.D. 1957, University of North Carolina at Chapel Hill

Bernhard Theodore Mittemeyer, *Assistant Clinical Professor of Urology*
B.S. 1952, Moravian College; M.D. 1956, Temple University

Albert Jay Modlin, *Associate Clinical Professor of Child Health and Development*
B.S. 1948, M.S. 1949, M.D. 1954, George Washington University

Barry Modlin, *Clinical Instructor in Otolaryngology*
B.S. 1958, M.S. 1959, M.D. 1963, George Washington University

Irvin Charles Mohler, Jr., *Research Instructor in Medical and Public Affairs and in Medicine*
B.S. 1949, Franklin and Marshall College; M.S. 1952, Pennsylvania State University

Gaetano Francis Molinari, *Clinical Professor of Neurology*
B.S. 1957, College of the Holy Cross; M.D. 1961, New Jersey College of Medicine and Dentistry

Allen Mendel Mondzac, *Assistant Clinical Professor of Medicine*
B.A. 1958, M.D. 1961, George Washington University

Marvin Ian Mones, *Special Lecturer in Child Health and Development*
B.S. 1940, Villanova University; M.D. 1947, Johns Hopkins University

Sara Hatcher Moore, *Instructor in Radiology (Radiation Therapy)*

George Albert Morales, *Associate Professor of Anesthesiology*
B.S. 1947, M.D. 1951, University of Mexico

Mark Francis Moran, *Assistant Clinical Professor of Radiology*
B.S. 1964, M.D. 1968, Marquette University

David Arthur Morowitz, *Associate Clinical Professor of Medicine*
M.D. 1963, University of Illinois at the Medical Center

Glenn Ellis Morris, *Associate Professor of Psychiatry and Behavioral Sciences (Allied Health) and of Health Care Administration*
B.S. 1933, M.A. 1939, University of Illinois at Urbana-Champaign; M.S. in H.A. 1956, Northwestern University

Dennis Ervin Morse, *Assistant Professor of Anatomy*
B.A. 1969, Hastings College; M.S. 1971, Ph.D. 1973, University of North Dakota

Robert Johnathan Morton, Jr., *Clinical Instructor in Radiology*
B.A. 1964, Catawba College; M.S. 1972, University of California, Los Angeles

Herbert Alan Moskovitz, *Assistant Clinical Professor of Medicine*
B.S. 1949, Georgia Institute of Technology; M.D. 1954, Emory University

Peter Alan Moskovitz, *Assistant Professor of Orthopaedic Surgery and of Child Health and Development*
B.A. 1965, Haverford College; M.D. 1969, Columbia University

Howard Otis Mott, *Assistant Clinical Professor of Medicine*
B.A. 1941, Union College, New York; M.D. 1944, George Washington University

Mahmoud Mourad, *Associate Professor of Medicine*
B.S. 1940, Ibrahimieh University, Egypt; P.N.S. 1942, M.B., Ch.B., M.D. 1952, Cairo University; M.A. 1960, New York University

Stephen Mourat, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1941, West Virginia University; M.D. 1944, Thomas Jefferson University

Nasser Movassaghi, *Associate Professor of Child Health and Development*
Natural Science 1950, Rahnema College, Iran; M.D. 1956, University of Tehran

Paul Robert Moyer, *Assistant Clinical Professor of Clinical Engineering*
B.S. 1963, Haverford College; M.D. 1967, University of Pennsylvania

Richard Arthur Muesing, *Research Instructor in Medicine*
B.S. 1960, Mankato State College; M.S. 1964, Ph.D. 1969, University of Illinois at Urbana-Champaign

Madan Gopal Mukhopadhyay, *Clinical Instructor in Medicine*
M.B., B.S. 1966, University of Calcutta

Michael Francis Mullarkey, *Clinical Instructor in Medicine and in Health Care Sciences*
B.A. 1963, Columbia University; M.D. 1970, Boston University

Alfred Muller, *Assistant Clinical Professor of Medicine*
B.A. 1962, Princeton University; M.D. 1966, Columbia University

Cornelius Francis Murphy, *Associate Clinical Professor of Radiology*
B.S. 1943, Boston College; M.D. 1956, Georgetown University

James Peter Murphy, *Associate Clinical Professor of Neurological Surgery*
B.S. 1935, College of St. Thomas; M.D. 1939, Yale University

Mary Diane Murphy, *Clinical Instructor in Child Health and Development*
B.S. 1967, Virginia Polytechnic Institute and State University; M.D. 1971, Virginia Commonwealth University

Francis James Murray, *Associate Clinical Professor of Medicine*
B.S. 1936, University of Notre Dame; M.D. 1940, Cornell University

Ntinos Myrianthopoulos, *Associate Clinical Professor of Neurology*
B.S. 1952, George Washington University; M.S. 1954, Ph.D. 1957, University of Minnesota

Gurbux Hariram Nachnani, *Associate Clinical Professor of Medicine*
M.B., B.S. 1963, B.J. Medical College, University of Poona

Joe Louis Naphier, *Special Lecturer in Radiology*

William Milton Narva, *Associate Clinical Professor of Dermatology*
B.A. 1952, Hofstra University; M.D. 1956, Yale University

Stephen Sanborn Nason, *Assistant Professor of Orthopaedic Surgery and of Child Health and Development*
M.D. 1967, Tulane University of Louisiana

Benjamin Henry Natelson, *Clinical Instructor in Neurology*
B.A. 1963, M.D. 1967, University of Pennsylvania

Edward Mark Nathan, *Assistant Clinical Professor of Surgery*
B.A. 1965, Cornell University; M.D. 1969, State University of New York Upstate Medical Center

John Patrick Naughton, *Professor of Medicine; Dean for Academic Affairs of the Medical Center*
B.S. 1954, St. Louis University; M.D. 1958, University of Oklahoma

Bertel Nelson, *Associate Clinical Professor of Medicine*
B.A. 1945, M.D. 1948, George Washington University

Fred Ritchie Trew Nelson, *Clinical Instructor in Orthopaedic Surgery*
B.A. 1963, Johns Hopkins University; M.D. 1967, University of Maryland

Karin Becker Nelson, *Associate Clinical Professor of Neurology and of Child Health and Development*
M.D. 1957, University of Chicago

Robert Burwell Nelson, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1932, M.D. 1936, University of Virginia

Warren James Nelson, *Associate Clinical Professor of Radiology*
B.S. 1948, University of Wisconsin—Madison; M.D. 1953, George Washington University

Richard Emil Nensel, *Assistant Clinical Professor of Pathology*
B.S. 1964, M.D. 1968, Marquette University

Julius Salem Neviaser, *Clinical Professor of Orthopaedic Surgery*
B.A. 1923, M.D. 1927, George Washington University

Robert Jon Neviaser, *Associate Professor of Orthopaedic Surgery*
B.A. 1958, Princeton University; M.D. 1962, Thomas Jefferson University

Thomas Jay Neviaser, *Clinical Instructor in Orthopaedic Surgery*
B.A. 1962, University of Pennsylvania; M.D. 1966, George Washington University

Michael Arthur Newman, *Assistant Professor of Health Care Sciences*
B.A. 1963, Stanford University; M.D. 1969, University of Rochester

William Newman, *Professor of Pathology*
B.A. 1941, University of Wisconsin—Madison; M.D. 1946, New York University

Joseph Ney, *Clinical Professor of Medicine*
B.S. 1931, University of Virginia; M.D. 1935, Harvard University

Richard Austin Nicklas, *Assistant Clinical Professor of Medicine*
B.A. 1958, Cornell University; M.D. 1964, George Washington University

Thomas Peter Nigra, *Assistant Clinical Professor of Dermatology*
B.A. 1963, St. Vincent College; M.D. 1967, University of Pennsylvania

John Herbert Niles, *Special Lecturer in Obstetrics and Gynecology*
B.S. 1959, Allegheny College; M.D. 1963, Howard University

David Charles Nitsche, *Special Lecturer in Pathology*
B.S. 1971, St. Bonaventure University

Raymon Augusta Noble, *Assistant Clinical Professor of Medicine*
B.S. 1962, Iowa Wesleyan College; M.D. 1966, University of Missouri—Columbia

Thomas Douglas Noble, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1924, M.B. 1927, M.D. 1936, University of Toronto

Henry Jason Norris, *Associate Clinical Professor of Pathology*
B.A. 1954, Linfield College; M.D. 1958, University of Rochester

Alexander Frederick North, Jr., *Associate Clinical Professor of Child Health and Development*
M.D 1956, Yale University

Joseph Dove Noshpitz, *Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1943, M.D. 1945, University of Louisville

Robert Allen Nover, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
B.A. 1961, Union College, New York; M.D. 1965, State University of New York Upstate Medical Center

John Francis Nowell, *Clinical Instructor in Ophthalmology*
B.S. 1954, M.D. 1956, University of Maryland

Martin Lawrence Nusynowitz, *Associate Clinical Professor of Radiology*
B.A. 1954, New York University; M.D. 1958, State University of New York Upstate Medical Center

James William Oberman, *Special Lecturer in Child Health and Development*
M.D. 1949, Georgetown University

Allen Albert Oboler, *Assistant Professor of Medicine*
M.D. 1966, Wayne State University

Charles Winston Ochs, *Clinical Professor of Radiology*
B.A. 1954, Washington University; M.D. 1958, Tulane University of Louisiana; M.S. 1961, University of Rochester

Joseph Brian O'Connell, *Associate Professor of Medicine*
M.B., Ch.B., B.A.O. 1957, University College, Dublin

Donald Ary O'Kieffe, *Associate Clinical Professor of Medicine*
B.A. 1960, M.D. 1964, Yale University

Peter Dean Olch, *Professorial Lecturer in Pathology (History of Medicine)*
B.A. 1951, Pomona College; M.D. 1955, Johns Hopkins University

Dennis Sophian O'Leary, *Associate Professor of Medicine and of Pathology (Laboratory Medicine); Associate Dean for Graduate Medical Education of the Medical Center*
B.A. 1960, Harvard University; M.D. 1964, Cornell University

Dale William Oller, *Assistant Professor of Surgery*
B.A. 1964, Franklin and Marshall College; M.D. 1968, George Washington University

William Wells Olmsted, *Assistant Clinical Professor of Radiology*
B.A. 1963, Williams College; M.D. 1968, University of Rochester; M.S. 1972, University of California, Los Angeles

Bennett Olshaker, *Associate Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1943, M.D. 1945, George Washington University

Mark Daniel Olson, *Assistant Professor of Anatomy and of Ophthalmology*
B.A. 1968, Concordia College, Minnesota; M.S. 1970, Ph.D. 1973, University of North Dakota

LeRoy Robert Oly, *Special Lecturer in Radiology*

Ayub Khan Ommaya, *Clinical Professor of Neurological Surgery*
M.D. 1953, King Edward Medical College; M.A. 1960, Balliol College

John Francis O'Neill, *Assistant Clinical Professor of Ophthalmology*
B.S. 1952, Mount St. Mary's College, Maryland; M.D. 1956, Georgetown University

Beale Hibbs Ong, *Associate Clinical Professor of Child Health and Development*
B.A. 1955, M.D. 1959, George Washington University

Sean O'Reilly, *Professor of Neurology*
M.B. 1949, M.D. 1952, National University of Ireland

Mario Ortega, *Clinical Instructor in Child Health and Development*
M.D. 1965, University of San Carlos

F. Helmuth Orthner, *Assistant Professor of Clinical Engineering*
Dipl.Ing. 1966, Technical University of Munich; Ph.D. 1973, University of Pennsylvania

Bernard Howard Ostrow, *Assistant Clinical Professor of Medicine*
B.A. 1944, Miami University; M.D. 1948, George Washington University

Neil Stuart Otchin, *Clinical Instructor in Medicine*
B.S. 1963, University of Florida; M.D. 1967, Duke University

Gilbert Ottenberg, *Assistant Clinical Professor of Urology*
B.A. 1922, M.A. 1924, M.D. 1928, George Washington University

Ronald Ottenberg, *Clinical Instructor in Orthopaedic Surgery*
B.A. 1956, M.D. 1959, George Washington University

Lewis Antoine Ottenritter, *Assistant Clinical Professor of Orthopaedic Surgery*
B.S. 1957, Loyola College; M.D. 1961, University of Maryland

Kathleen Leinau Owens, *Clinical Instructor in Psychiatry and Behavioral Sciences (Social Work)*
B.A. 1954, M.A. 1962, University of California, Berkeley; M.S.W. 1969, Howard University

Mark Norman Ozer, *Associate Research Professor of Child Health and Development*
B.A. 1953, Harvard University; M.D. 1957, Boston University

Russell Smith Page, Jr., *Assistant Clinical Professor of Otolaryngology*
B.A. 1936, Dartmouth College; M.D. 1940, University of Vermont

Barton Pakull, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1957, City University of New York, City College; M.D. 1961, State University of New York Upstate Medical Center

Richard Emery Palmer, *Associate Clinical Professor of Pathology*
B.A., M.D. 1944, George Washington University

John Pan, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1966, University of Notre Dame; M.D. 1970, George Washington University

Stephen Stavros Pappas, *Clinical Instructor in Ophthalmology*
B.S. 1952, M.D. 1956, George Washington University

Edwin Pearson Parker III, *Clinical Professor of Medicine*
B.S. 1939, M.D. 1942, University of Virginia

Dee Rich Parkinson, *Assistant Clinical Professor of Pathology*
M.D. 1943, George Washington University

Marshall Miller Parks, *Clinical Professor of Ophthalmology and of Child Health and Development*
B.A. 1939, Illinois College; M.D. 1943, St. Louis University

Alvin Edward Parrish, *Professor of Medicine*
M.D. 1945, George Washington University

Robert Harold Parrott, *Professor of Child Health and Development*
M.D. 1949, Georgetown University

Robert Wilton Parsons, *Associate Clinical Professor of Surgery*
Ph.B. 1949, University of Chicago; M.D. 1964, Washington University

Harold Irwin Passes, *Assistant Clinical Professor of Medicine*
M.B., B.S. 1949, University of London

Daniel Young Patterson, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1962, M.D. 1966, University of Kentucky; M.P.H. 1970, Johns Hopkins University

Geraldine Winnie Paul, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1953, University of Richmond; M.D. 1960, Medical College of Virginia of Virginia Commonwealth University

Wilbur Gene Paullin, *Clinical Instructor in Radiology*

Beneta Jane Peacock, *Assistant Professor of Child Health and Development*
B.A. 1946, Mary Baldwin College; M.D. 1965, New York University

Harry John Pearson, *Assistant Clinical Professor of Pathology (Laboratory Medicine)*
B.S. 1964, Muhlenberg College; M.D. 1968, University of Pennsylvania

Jed Williams Pearson, Jr., *Associate Clinical Professor of Obstetrics and Gynecology*
B.A. 1934, DePauw University; M.D. 1938, Indiana University at Indianapolis

Roland Lee Peckham, *Special Lecturer in Pathology*

Frank Alan Pedreira, *Assistant Clinical Professor of Child Health and Development*
B.A. 1959, Rutgers University, New Brunswick; M.D. 1963, State University of New York Upstate Medical Center

Paul Thomas Peebles, *Assistant Clinical Professor of Child Health and Development*
B.S. 1963, John Carroll University; M.D. 1967, Case Western Reserve University

Roger Peele, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1955, University of North Carolina at Chapel Hill; M.D. 1960, University of Tennessee Medical Units

Juan Carlos Penhos, *Associate Professorial Lecturer in Medicine (Endocrinology)*
M.D. 1942, University of Buenos Aires

Phillip O'Keefe Periman, *Assistant Professor of Medicine*
B.A. 1961, Yale University; M.D. 1965, Washington University

John Calvin Perkins, *Clinical Instructor in Medicine*
B.A. 1956, M.D. 1960, Harvard University

Walter Reams Perkins, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1957, University of Richmond; M.D. 1961, Medical College of Virginia of Virginia Commonwealth University

Stanley Morton Perl, *Clinical Instructor in Radiology*
B.A. 1960, Brown University; M.D. 1964, University of Pittsburgh

Elliott Perlin, *Assistant Professor of Medicine*
B.S. 1957, George Washington University; M.D. 1961, Thomas Jefferson University

Louis Robert Perna, *Assistant Clinical Professor of Surgery*
B.A. 1950, M.D. 1953, George Washington University

Louis Edward Perraut, *Clinical Instructor in Ophthalmology*
B.A. 1945, University of Kentucky; M.D. 1946, University of Louisville

Lowell Wesley Perry, *Associate Professor of Child Health and Development*
M.D. 1960, Temple University

Dominique Pessayre, *Assistant Research Professor of Pharmacology*
M.D. 1973, University of Paris

Danna Bowers Peterson, *Assistant Professor of Anesthesiology*
M.B.Ch.B. 1967, University of Edinburgh

Kent Albrecht Peterson, *Assistant Clinical Professor of Orthopaedic Surgery*
B.A. 1956, M.D. 1959, George Washington University

Leonard Theodore Peterson, *Clinical Professor of Orthopaedic Surgery*
B.A., B.S. 1928, M.D. 1931, University of Minnesota

William Frank Peterson, *Assistant Clinical Professor of Obstetrics and Gynecology*
M.D. 1946, New York Medical College

Michael Phillips, *Clinical Instructor in Medicine*
B.A. 1962, City University of New York, Brooklyn College; M.D. 1967, State University of New York at Buffalo

Stanley Michael Phillips, *Assistant Clinical Professor of Medicine*
B.S. 1962, M.D. 1966, University of Wisconsin

Steve Richard Pieczenik, *Clinical Instructor in Psychiatry and Behavioral Sciences*
B.A. 1964, M.D. 1968, Cornell University

Thomas Eugene Piemme, *Professor of Health Care Sciences and of Medicine*
B.S. 1954, M.D. 1958, University of Pittsburgh

Lawrence Pierce, *Associate Professor of Medicine*
M.D. 1955, Georgetown University

Roger James Pierce, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1964, George Washington University; M.D. 1968, Georgetown University

Howard Clemeth Pierpont, *Associate Professor of Surgery*
B.A. 1939, Marietta College; M.D., C.M. 1943, McGill University

Dean Lawrence Pierson, *Clinical Instructor in Dermatology*
B.S. 1962, M.P.H. 1963, University of California, Berkeley; M.D. 1967, Temple University

Phyllis Tilson Piotrow, *Assistant Research Professor of Medical and Public Affairs*
B.A. 1954, Bryn Mawr College; M.A. 1959, University of Oxford; Ph.D. 1971, Johns Hopkins University

Hanna Zulauf Pipberger, *Assistant Research Professor of Clinical Engineering*
B.A. 1942, Teachers College, Chur, Switzerland

Hubert Vincent Pipberger, *Professor of Clinical Engineering and of Medicine*
B.A. 1938, Deutsches College, Germany; M.D. 1951, Rheinische Friedrich Wilhelms University

Joseph Michael Pisani, *Associate Clinical Professor of Medicine*
B.A. 1938, Fordham University; M.D. 1942, New York University

Mark Melvin Platt, *Assistant Professor of Neurology and of Child Health and Development*
B.A. 1962, M.D. 1966, University of Vermont

Harold Plotsky, *Clinical Instructor in Child Health and Development and in Psychiatry and Behavioral Sciences*
Ph.B. 1945, B.S. 1947, M.D. 1949, University of Chicago

Frederick William Plugge IV, *Professor of Surgery*
B.A. 1953, University of Pennsylvania; M.D. 1957, University of Maryland

George Nicholas Polis, *Assistant Clinical Professor of Medicine*
B.S. 1951, Georgetown University; M.D. 1955, University of Maryland

Donald David Pollock, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1960, Amherst College; M.D. 1964, Albany Medical College of Union University

Robert Smallwood Poole, *Assistant Clinical Professor of Medicine*
B.A. 1950, M.D. 1953, George Washington University

Jerrold Morton Post, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1956, M.D. 1960, Yale University

Lynne Frances Potempa, *Special Lecturer in Pathology*
B.M.S. 1964, University of Missouri

Barry Potter, *Assistant Professor of Radiology and of Child Health and Development*
B.A. 1963, City University of New York, Brooklyn College; M.D. 1967, State University of New York Downstate Medical Center

Kattadiyil Poulose, *Associate Research Professor of Radiology (Nuclear Medicine)*
B.S. 1954, Maharajas College, India; M.B., B.S. 1959, M.D. 1964, Medical College, Trivandrum, India

Andrew Gabriel Prandoni, *Clinical Professor of Medicine*
B.S. 1934, Fordham University; M.D. 1938, State University of New York Downstate Medical Center

Michael Francis Pratt, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1972, University of Maryland

Michael Lee Pratt, *Clinical Instructor in Pathology (Blood Banking)*
B.S. 1966, University of Iowa

Barry David Pressman, *Assistant Professor of Radiology*
B.A. 1964, B.M.S. 1965, Dartmouth College; M.D. 1967, Harvard University

James Louis Preston, *Special Lecturer in Epidemiology and Environmental Health*

Neal Jack Price, *Associate Clinical Professor of Obstetrics and Gynecology*
B.A. 1939, B.S. 1940, M.D. 1942, University of Oklahoma

Robert Henry Price, *Special Lecturer in Epidemiology and Environmental Health*

Louis Franklin Pridgen, *Special Lecturer in Radiology*

Milo Prodanovich, *Clinical Instructor in Pathology (Clinical Chemistry)*
B.S. 1965, M.A. 1968, California State University, San Diego

Felton Ray Pugh, *Special Lecturer in Radiology*

Louis Quain Pugsley, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1954, Hamilton College; M.D. 1958, Cornell University

Jose Rafael Puig, *Associate Professor of Child Health and Development*
M.D. 1950, Santo Domingo University

Robert Earl Pumphrey, Jr., *Assistant Clinical Professor of Otolaryngology*
B.S. 1955, Denison University; M.D. 1959, Ohio State University

Lawrence Elias Putnam, *Clinical Professor of Medicine*
B.A. 1930, M.D. 1934, Harvard University

Lawrence Pyle, Jr., *Assistant Clinical Professor of Epidemiology and Environmental Health*
M.D. 1939, Duke University

James Tindal Quattlebaum, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1955, University of South Carolina; M.D. 1956, Medical University of South Carolina
M.A. 1961, Columbia University

Boris Rabkin, *Assistant Clinical Professor of Medicine*
B.A. 1939, New York University; M.D. 1943, George Washington University

Luis Carlos Radice, *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1957, University of Buenos Aires

Robert Douglas Ralph, *Clinical Instructor in Otolaryngology*
M.D. 1932, Queen's University, Canada

Devanhalli Ramaswamy, *Clinical Instructor in Medicine*
M.D. 1961, University of Mysore

James North Ramey, *Assistant Clinical Professor of Medicine*
B.A. 1964, Amherst College; M.D. 1968, Columbia University

Judson Graves Randolph, *Professor of Surgery and of Child Health and Development*
B.A. 1950, M.D. 1953, Vanderbilt University

Joseph Eugene Rankin, *Professor of Psychiatry and Behavioral Sciences*
B.S. 1942, Catholic University of America; M.D. 1946, George Washington University

Harold Elton Ratcliffe, *Clinical Professor of Medicine*
B.A. 1935, M.D. 1939, Tulane University of Louisiana

Richard Albert Ratner, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences and of Medicine*
B.A. 1962, University of Chicago; M.D. 1966, University of Pennsylvania

Kent Ravenscroft, Jr., *Assistant Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
B.A. 1962, Yale University; M.D. 1966, Harvard University

James Lamar Read, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1949, M.D. 1953, University of Maryland

Richard Charney Reba, *Clinical Professor of Radiology*
M.D. 1957, University of Maryland

Maurice Merrick Reeder, *Clinical Professor of Radiology*
B.A. 1954, Loyola College; M.D. 1958, University of Maryland

Anne Hollis Reese, *Clinical Instructor in Psychiatry and Behavioral Sciences (Social Work)*
B.A. 1959, Case Western Reserve University; M.S. 1962, Columbia University

Thomas Sargent Reese, *Professorial Lecturer in Anatomy*
B.A. 1957, Harvard University; M.D. 1962, Columbia University

Frederick Reeser, *Assistant Clinical Professor of Ophthalmology*
B.A. 1961, Duke University; M.D. 1965, University of Pennsylvania

Robert Michael Regan, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1957, Hamilton College; M.D. 1964, George Washington University

Melvin Reich, *Associate Professor of Microbiology*
B.S. 1953, City University of New York, City College; M.S. 1957, Ph.D. 1960, Rutgers University, New Brunswick

David Reiss, *Professor of Psychiatry and Behavioral Sciences and of Medicine*
B.A. 1958, M.D. 1962, Harvard University

Marilyn Lewis Renfield, *Assistant Clinical Professor of Child Health and Development*
B.A. 1961, Duke University; M.D. 1965, George Washington University

Philip Louis Repetto, Jr., *Assistant Clinical Professor of Dermatology*
B.A. 1951, M.D. 1955, University of Pennsylvania

Harvey Resnik, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1951, State University of New York at Buffalo; M.D. 1955, Columbia University

Frederick Turner Reuter, *Associate Clinical Professor of Urology*
M.D. 1944, George Washington University

Thomas Dewitt Reynolds, *Associate Clinical Professor of Psychiatry and Behavioral Sciences (Experimental Psychiatry)*
B.A. 1949, M.D. 1955, University of Chicago

Richard Coleman Rhame, *Assistant Clinical Professor of Urology*
B.A. 1950, Princeton University; M.D. 1954, George Washington University

Jack Jacob Rheingold, *Clinical Professor of Medicine*
B.A. 1936, University of Alabama; M.B. 1940, M.D. 1941, University of Cincinnati

Charles Lane Rice, *Assistant Professor of Surgery*
B.A. 1964, University of Georgia; M.D. 1968, Medical College of Georgia

Norman Minner Rich, *Associate Professor of Surgery*
B.A. 1956, M.D. 1960, Stanford University

Calvin Maynard Richardson, *Special Lecturer in Radiology*

Henry Burtt Richardson, Jr., *Associate Professor of Child Health and Development*
B.A. 1956, Haverford College; M.D. 1960, Temple University

Sanford Norman Richman, *Assistant Clinical Professor of Medicine*
B.S. 1960, University of Georgia; M.D. 1964, Medical College of Georgia

Barton Winters Richwine, *Associate Clinical Professor of Obstetrics and Gynecology*
M.D. 1934, George Washington University

LeRoy Riddick, *Assistant Clinical Professor of Pathology (Forensic)*
B.A. 1954, Princeton University; M.A. 1965, Columbia University; M.D. 1969, New Jersey College of Medicine and Dentistry

Rebecca Eisenberg Rieger, *Research Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1940, City University of New York, Hunter College; M.A. 1941, Columbia University; M.A. 1952, Ph.D. 1960, Catholic University of America

Charles Andrew Rigg, *Associate Professor of Child Health and Development*
M.B., B.Surg. 1951, University of Sydney; M.R.A.C.P. 1955, F.R.A.C.P. 1968, Royal Australasian College of Physicians

Rita Coronado Rigor, *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1965, University of Santo Tomas, Philippines

Norman Charles Rintz, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1927, University of Pennsylvania; M.D. 1931, Thomas Jefferson University

Jorge Carlos Rios, *Associate Professor of Medicine*
M.D. 1959, University of Buenos Aires

Surendra Ramchandra Rishi, *Clinical Instructor in Medicine*
M.B., B.S. 1953, M.D. 1957, University of Bombay

Gussey Rivers, *Special Lecturer in Epidemiology and Environmental Health*

Hugo Victor Rizzoli, *Professor of Neurological Surgery*
B.A. 1936, M.D. 1940, Johns Hopkins University

Mary Louise Robbins, *Professor of Microbiology*
B.A. 1934, American University; M.A. 1940, Ph.D. 1944, George Washington University

Morton Jay Roberts, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1964, Franklin and Marshall College; M.D. 1968, George Washington University

William Clifford Roberts, *Special Lecturer in Medicine (Cardiology)*
B.A. 1954, Southern Methodist University; M.D. 1958, Emory University

Robert Hood Robertson, *Clinical Instructor in Neurology*
M.D. 1948, Temple University

Carolyn Bauer Robinowitz, *Associate Clinical Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
B.A. 1959, Wellesley College; M.D. 1964, Washington University

Albert Irving Robins, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.S. 1937, George Washington University; M.D. 1941, Georgetown University

Douglas Neil Robins, *Clinical Instructor in Dermatology*
B.S. 1965, Washington and Lee University; M.D. 1969, George Washington University

John David Robinson, *Visiting Lecturer in Psychiatry and Behavioral Sciences (Psychology)*
B.A. 1968, M.A. 1969, Ph.D. 1971, University of Texas at Austin

Luther Dabney Robinson, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1943, Virginia State College; M.D. 1946, Meharry Medical College

Patsy June Robinson, *Assistant Professor of Pathology (Microbiology)*
B.S. 1954, Louisiana State University and Agricultural and Mechanical College; M.S. 1964, Michigan State University

Joseph Richard Robson, Sr., *Special Lecturer in Epidemiology and Environmental Health*

S. David Rockoff, *Professor of Radiology*
B.A. 1951, Syracuse University; M.D. 1955, Albany Medical College of Union University; M.S. 1961, University of Pennsylvania

Harold Irvin Rodman, *Clinical Instructor in Ophthalmology*
B.A. 1952, Johns Hopkins University; M.D. 1956, University of Maryland

Orlando Gilbert Rodman, *Associate Clinical Professor of Dermatology*
B.A. 1961, Valparaiso University; M.D. 1965, Howard University

Chalon Rodriguez, *Associate Clinical Professor of Urology*
M.D. 1943, University of Havana

Gary Lee Roecker, *Special Lecturer in Pathology*
B.S. 1972, Kent State University

Gerald David Rogell, *Assistant Clinical Professor of Ophthalmology*
B.A. 1963, M.D. 1967, Harvard University

Charles Clanton Rogers, *Professor of Radiology (Radiation Therapy)*
B.A. 1956, Maryville College, Tennessee; M.D. 1960, University of Arkansas

Richard Allan Rogers, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1941, University of Washington; M.D. 1944, Northwestern University

Manouchehr Rokni, *Clinical Instructor in Child Health and Development*
M.D. 1960, University of Tehran

James Holt Rollen, *Special Lecturer in Pathology*

Frank Edward Rollins, *Special Lecturer in Epidemiology and Environmental Health*

Monroe James Romansky, *Professor of Medicine*
B.A. 1933, University of Maine at Orono; M.D. 1937, University of Rochester

Walter Joseph Romejko, *Assistant Clinical Professor of Ophthalmology*
B.S. 1934, St. Joseph's College, Pennsylvania; M.D. 1938, Thomas Jefferson University

Cheryl Marie Roock, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.A. 1967, State University of New York at Oswego

Morton Harold Rose, *Assistant Clinical Professor of Medicine*
M.D. 1942, George Washington University

Robert Earl Rose, *Research Instructor in Medicine*
B.S. 1961, Boston University; M.S. 1967, University of Iowa

Arthur Bernard Rosenbaum, *Clinical Professor of Medicine*
B.S. 1931, City University of New York, City College; M.D. 1935, New York University

Meyer Rosenbaum, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.S. 1942, M.D. 1944, Tulane University of Louisiana

Charles Alan Rosenberg, *Clinical Professor of Medicine*
B.A. 1942, Syracuse University; M.D. 1944, State University of New York Upstate Medical Center

Morris Hirsh Rosenberg, *Associate Clinical Professor of Medicine*
B.A. 1938, M.D. 1941, George Washington University

Stephen Rosenblum, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1963, Amherst College; M.D. 1967, Columbia University

Myer Hyman Rosenthal, *Assistant Clinical Professor of Anesthesiology*
B.A. 1963, University of Massachusetts–Amherst; M.D. 1967, University of Vermont

Douglas Roy Rosing, *Assistant Professor of Medicine*
B.A. 1963, Princeton University; M.D. 1967, State University of New York at Buffalo

Earl Joseph Ross, *Assistant Professorial Lecturer in Epidemiology and Environmental Health*
B.A. 1967, University of Maryland; M.A. in Ed. 1971, George Washington University

Norman Phillip Ross, *Assistant Professorial Lecturer in Epidemiology and Environmental Health*
B.S. 1964, Ed.M. 1970, Ph.D. 1973, University of Maryland

Richard Harold Ross, *Associate Research Professor of Medical and Public Affairs*
B.A. 1955, M.B.A. 1963, George Washington University

Sydney Ross, *Clinical Professor of Child Health and Development*
B.S. 1940, M.D. 1943, Harvard University

Robert Allen Roth, *Clinical Instructor in Urology*
M.D. 1968, Case Western Reserve University

Leonard Earl Rothkoff, *Clinical Instructor in Ophthalmology*
M.D. 1965, Yeshiva University

Irwin Winn Rovner, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1948, M.D. 1953, University of Iowa

Timothy Robert Roy, *Special Lecturer in Pathology*
B.A. 1971, University of New Hampshire

Norman Hartley Rubenstein, *Assistant Clinical Professor of Medicine*
M.D. 1950, George Washington University

Jesse Gallant Rubin, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1953, Franklin and Marshall College; M.D. 1957, Yale University

Lily Ruckstuhl, *Clinical Instructor in Medicine*
M.D. 1954, University of Geneva

Cesar Rudzki, *Assistant Clinical Professor of Medicine*
M.D. 1961, University of Buenos Aires; M.P.H. 1969, Johns Hopkins University

Marshall deGraffenried Ruffin, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1932, University of Virginia; M.D. 1936, Harvard University

Arthur Ruskin, *Associate Clinical Professor of Medicine*
B.S. 1932, City University of New York, City College; M.D. 1936, New York University

Urs Eugene Ruttimann, *Assistant Professor of Clinical Engineering*
M.S. in E.E. 1966, Swiss Federal Institute of Technology; Ph.D. 1972, University of Pennsylvania

Joseph Aziz Sabri, *Assistant Clinical Professor of Otolaryngology*
B.A. 1941, M.D. 1946, American University of Beirut

Fernando Sacasa, *Assistant Clinical Professor of Surgery (Oral)*
D.D.S. 1935, Georgetown University

Josiah Sacks, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1951, Providence College; M.D. 1955, Tufts University

Harold Charles Sadin, *Assistant Clinical Professor of Medicine*
B.A. 1948, Hamilton College; M.D. 1952, Albany Medical College of Union University

Armando Saenz, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1957, University of Texas at El Paso; M.D. 1963, University of Texas Southwestern Medical School at Dallas

John Harmer Sager, *Clinical Instructor in Surgery*
B.A. 1948, Princeton University; M.D. 1952, George Washington University

Nirmal Saini, *Associate Professor of Pathology*
M.B., B.S. 1957, King Edward Medical College, India

Virender Kumar Saini, *Assistant Clinical Professor of Radiology*
M.B., B.S. 1954, R.G. Kar Medical College, India; M.S. 1960, University of Oklahoma

Hernando Salcedo, *Clinical Instructor in Urology*
B.S. 1955, University College, Colombia; M.D. 1962, Javeriana University, Colombia

Stanton Ethan Samenow, *Clinical Instructor in Psychiatry and Behavioral Sciences (Psychology)*
B.A. 1963, Yale University; M.A. 1964, Ph.D. 1968, University of Michigan

Paul Joseph Sanazaro, *Clinical Professor of Health Care Sciences*
B.A. 1944, University of California, Berkeley; M.D. 1946, University of California, San Francisco

Jeffrey Allan Sandler, *Clinical Instructor in Health Care Sciences and in Medicine*
M.D. 1971, University of Illinois at the Medical Center

Melvin Wesley Sandmeyer, Jr., *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1950, M.D. 1953, George Washington University

Lawrence Sank, *Assistant Professor of Health Care Sciences and of Psychiatry and Behavioral Sciences*
B.A. 1968, Brandeis University; M.S. 1970, Ph.D. 1972, Rutgers University, New Brunswick

Rolando LaBorce Santos, *Special Lecturer in Pathology*

Thomas Stone Sappington, *Clinical Professor of Medicine*
B.A. 1937, M.D. 1941, Harvard University

Rajindra Kumar Sarin, *Associate Clinical Professor of Medicine*
M.B., B.S. 1962, Panjab University, India

David Satinsky, *Clinical Instructor in Neurology*
B.A. 1960, M.D. 1964, University of Pennsylvania

Robert Sauer, *Clinical Professor of Pathology (Comparative)*
D.V.M. 1952, University of Pennsylvania

Melchior Savarese, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1946, Yale University; M.D. 1949, Georgetown University

Sumner Alan Savitz, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1957, Massachusetts Institute of Technology; M.D. 1961, Tufts University

Raymond Scalettar, *Associate Clinical Professor of Medicine*
B.A. 1950, Columbia University; M.D. 1954, State University of New York Downstate Medical Center

Giuseppe Scarcella, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1947, Bologna University

Geraldine Schaeffer, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1954, University of Pennsylvania; M.D. 1958, Medical College of Pennsylvania

Leslie Schaffer, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
M.B. 1942, M.B., Ch.B. 1948, University of London

David Edward Scharff, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1962, Yale University; M.D. 1966, Harvard University

Alan Neil Schechter, *Professorial Lecturer in Biochemistry*
B.A. 1959, Cornell University; M.D. 1963, Columbia University

Geraldine Poppa Schechter, *Associate Professor of Medicine*
B.A. 1959, Vassar College; M.D. 1963, Columbia University

Heinz Hanns Eduard Scheidemandel, *Clinical Instructor in Otolaryngology*
M.D. 1935, University of Erlangen

Irwin Scher, *Assistant Professor of Medicine*
B.S. 1962, State University of New York at Albany; M.D. 1966, Yeshiva University

Paul Schlein, *Assistant Clinical Professor of Medicine*
B.A. 1952, M.D. 1956, Cornell University

Charles Isaac Schneiderman, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1964, University of Michigan; M.D. 1968, George Washington University

Richard Schoenfeld, *Assistant Clinical Professor of Medicine*
B.S. 1954, University of Wisconsin—Madison; M.D. 1958, State University of New York Downstate Medical Center

Robert Charles Schoening, *Special Lecturer in Pathology*

James Anthony Schoettler, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1953, California State University, Fresno; M.D. 1957, Johns Hopkins University

George Jerome Schonholtz, *Assistant Clinical Professor of Orthopaedic Surgery*
B.A. 1950, New York University; M.D. 1954, State University of New York Downstate Medical Center

Steven Alfred Schroeder, *Associate Professor of Health Care Sciences and of Medicine*
B.A. 1960, Stanford University; M.D. 1964, Harvard University

Marianne Schuelein, *Special Lecturer in Child Health and Development*
B.A. 1955, Wellesley College; M.D. 1959, New York University

Carol Ann Brimberg Schulman, *Clinical Instructor in Child Health and Development*
B.A. 1966, Radcliffe College; M.D. 1970, Georgetown University

Cyril Augustus Schulman, *Associate Clinical Professor of Medicine*
B.S. 1938, M.D. 1942, George Washington University

Charles John Schulte III, *Special Lecturer in Child Health and Development*
B.A. 1958, Johns Hopkins University; M.D. 1962, Albany Medical College of Union University

Morris Aaron Schultz, *Assistant Clinical Professor of Orthopaedic Surgery*
B.A. 1955, Rice University; M.D. 1959, University of Texas Medical Branch at Galveston

Forrest Veil Schumacher, *Assistant Clinical Professor of Radiology*
B.A. 1942, Lehigh University; M.D. 1945, University of Pennsylvania

Maxine Ann Schurter, *Associate Clinical Professor of Surgery*
B.A. 1944, Pomona College; M.D. 1951, George Washington University

Dean Schuyler, *Special Lecturer in Psychiatry and Behavioral Sciences*
B.A. 1963, M.D. 1967, New York University

Harry Alfred Schwamm, *Associate Clinical Professor of Pathology*
B.A. 1950, New York University; M.D. 1957, University of Zurich

David Taylor Schwartz, *Assistant Clinical Professor of Urology*
B.A. 1959, Harvard University; M.D. 1963, Columbia University

Don Elliot Schwartz, *Assistant Clinical Professor of Ophthalmology*
B.S. 1963, City University of New York, Queens College; M.D. 1967, Yeshiva University

Harvey Albert Schwartz, *Assistant Clinical Professor of Medicine*
B.S. 1963, City University of New York, Queens College; M.D. 1967, State University of New York at Buffalo

Richard Harvey Schwartz, *Clinical Instructor in Child Health and Development*
B.A. 1960, George Washington University; M.D. 1965, Georgetown University

Stanley Alvin Schwartz, *Assistant Clinical Professor of Medicine*
B.S. 1955, Alfred University; M.D. 1959, Albany Medical College of Union University

Noel Asher Schweig, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1951, Wesleyan University; M.D. 1956, Duke University

Agnes Eva Schweitzer, *Clinical Instructor in Child Health and Development*
B.S. 1955, M.D., C.M. 1959, McGill University

Lewis Pennington Scott III, *Professor of Child Health and Development*
M.D. 1954, Thomas Jefferson University

Robert Coleman Eugene Scott, *Special Lecturer in Pathology*

Winfield Harker Scott, *Associate Professor of Medicine and of Psychiatry and Behavioral Sciences; Assistant Dean for Education and Director of Education of the Medical Center*
B.S. 1954, M.S. 1955, Ph.D. 1958, Pennsylvania State University

Joan Rice Sealy, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1964, University of Chicago; M.D. 1968, George Washington University

Henry Francis Sears II, *Assistant Clinical Professor of Surgery*
B.A. 1962, University of Pennsylvania; M.D. 1966, Columbia University

Amiel Segal, *Assistant Clinical Professor of Medicine (Hematology-Oncology)*
B.A. 1962, Harvard University; M.D. 1966, University of Pennsylvania

Ira Seiler, *Special Lecturer in Child Health and Development*
M.D. 1956, State University of New York Downstate Medical Center

David Murray Seitzman, *Assistant Clinical Professor of Urology*
B.A. 1951, M.D. 1954, Vanderbilt University

Alvin Seltzer, *Assistant Clinical Professor of Medicine*
B.S. 1937, University of Illinois at Urbana-Champaign; M.D. 1941, University of Illinois at the Medical Center

Hrant Samuel Semerdjian, *Assistant Professor of Urology*
B.S. 1962, M.D. 1965, American University of Beirut

John Louis Sever, *Special Lecturer in Child Health and Development*
M.D., Ph.D. 1957, Northwestern University

Michael John Shaffer, *Assistant Professor of Anesthesiology*
B.S. in E.E. 1949, University of Leeds

Mohammad Shahvari, *Assistant Professor of Anesthesiology and of Pharmacology*
M.D. 1968, Pahlavi University, Iran; M.S. 1973, Temple University

Edward Robert Shapiro, *Clinical Instructor in Psychiatry and Behavioral Sciences*
B.A. 1962, Yale University; M.A. 1966, Stanford University; M.D. 1968, Harvard University

Robert David Shapiro, *Assistant Clinical Professor of Surgery (Oral)*
B.S. 1960, D.D.S. 1962, Case Western Reserve University

Roger Lee Shapiro, *Professor of Psychiatry and Behavioral Sciences*
B.S. 1947, M.D. 1949, University of Chicago

Stephen Robert Shapiro, *Assistant Professor of Child Health and Development*
B.S. 1963, Tufts University; M.D. 1967, New York University

Benjamin Alfonza Shaver, *Assistant Clinical Professor of Child Health and Development*
B.S. 1952, Massachusetts Institute of Technology; M.D. 1956, Yale University

Richard Cowen Shaw, *Assistant Clinical Professor of Surgery*
B.A. 1957, M.D. 1961, University of Kansas

Samuel Hazen Shea, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1933, M.D. 1936, George Washington University

Robert Shearin, *Assistant Clinical Professor of Child Health and Development*
B.S. 1964, North Carolina State University at Raleigh; M.D. 1968, University of North Carolina at Chapel Hill

Michael Mendel Shefferman, *Assistant Clinical Professor of Medicine*
B.A. 1958, Johns Hopkins University; M.D. 1962, University of Maryland

Joseph Lee Sheridan, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1939, Indiana University at Bloomington; M.D. 1943, Indiana University at Indianapolis

Barbara Ensfield Sherwin, *Assistant Professor of Medicine*
B.S. 1959, Antioch College; M.D. 1967, George Washington University

Sharadchandra Shinde, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1954, M.B., B.S. 1960, University of Bombay

Paul Edgar Shorb, Jr., *Associate Professor of Surgery*
B.A. 1951, Williams College; M.D. 1955, Johns Hopkins University

Harvey Alan Shulman, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1970, Rochester Institute of Technology

Irwin Shuman, *Assistant Clinical Professor of Urology*
B.S. 1955, George Washington University; M.D. 1959, Georgetown University

Robert Stanley Siegel, *Clinical Instructor in Surgery (Oral)*
B.S. 1958, D.D.S. 1961, University of Maryland

Howard Silby, *Clinical Instructor in Neurology*
B.A. 1957, Dartmouth College; M.D. 1962, State University of New York at Buffalo

Carlos Alberto Silva, *Assistant Clinical Professor of Surgery*
B.S. 1956, University of Puerto Rico; M.D. 1960, George Washington University

Omega Cecile Logan Silva, *Assistant Professor of Medicine*
B.S. 1958, M.D. 1967, Howard University

Harold Martin Silver, *Clinical Professor of Medicine*
B.A. 1946, M.D. 1949, Columbia University

Mary Rottschaefer Silverman, *Assistant Professor of Health Care Sciences*
B.S.N. 1965, M.P.H. 1970, University of Michigan

Henry Simmons, *Associate Clinical Professor of Medicine*
B.S. 1951, M.D. 1954, University of Pittsburgh; M.P.H. 1965, Harvard University

David Bart Simon, *Assistant Clinical Professor of Medicine*
M.D. 1967, George Washington University

Ernest Robert Simon, *Professor of Medicine*
M.D. 1954, Harvard University

Kenneth Alan Simon, *Assistant Clinical Professor of Ophthalmology*
B.A. 1952, University of Pennsylvania; M.S. 1955, M.D. 1957, Yale University

Herbert Charles Singer, *Assistant Clinical Professor of Medicine*
B.A. 1960, Ohio Wesleyan University; M.D. 1964, Washington University

Barbara Lee Scherzer Sinha, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1969, Ohio State University

Maurice Arthur Sislen, *Assistant Clinical Professor of Medicine*
B.A. 1944, M.D. 1947, George Washington University

James Glover Sites, *Professor of Obstetrics and Gynecology*
M.D. 1947, George Washington University

John Chauncey Skilling, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1955, Princeton University; M.D. 1961, Hahnemann Medical College

Jay Samuel Skyler, *Assistant Clinical Professor of Medicine*
B.S. 1967, Pennsylvania State University; M.D. 1969, Thomas Jefferson University

William Steven Slimak, *Special Lecturer in Pathology*

Alvin Jay Slovin, *Assistant Professor of Surgery*
B.A. 1959, Harvard University; M.D. 1963, State University of New York Downstate Medical Center

Allen Small, *Clinical Instructor in Otolaryngology*
B.A. 1962, Columbia University; M.D. 1966, State University of New York Downstate Medical Center

Benjamin Edgar Smith, *Special Lecturer in Radiology*

Benjamin Williams Smith, *Professor of Biochemistry*
B.S. 1940, Virginia Polytechnic Institute and State University; M.S. 1947, Ph.D. 1951, George Washington University

Bruce Hamilton Smith, *Professor of Pathology*
B.A. 1940, M.D. 1943, Syracuse University

Donald Ray Smith, *Assistant Professor of Neurological Surgery*
M.D. 1963, Louisiana State University Medical Center

James Cecil Smith, Jr., *Special Lecturer in Biochemistry*
B.S. 1956, M.S. 1959, Ph.D. 1964, University of Maryland

James Joseph Smith, *Clinical Professor of Radiology (Nuclear Medicine)*
B.A. 1932, Catholic University of America; M.D. 1940, Yale University

Joseph Smith, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1947, M.D. 1952, University of Virginia

Kent Thornton Smith, *Special Lecturer in Pathology*

Lee Elton Smith, *Assistant Clinical Professor of Surgery*
B.A. 1959, University of California, Berkeley; M.D. 1962, University of California, San Francisco

Norman John Smith, *Assistant Professor of Radiology (Radiotherapy)*
B.S. 1966, University of Akron; M.D. 1970, Case Western Reserve University

Robert Benjamin Warfield Smith, *Associate Clinical Professor of Medicine*
M.D. 1949, Columbia University

Ronald Walter Smith, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1953, University of Maryland; M.D. 1957, George Washington University

Marija Demsar Smokvina, *Instructor in Child Health and Development*
M.D. 1959, University of Ljubljana

Geoffrey Leonard Smoron, *Assistant Clinical Professor of Radiology*
M.D. 1969, Loyola University of Chicago

Nicholas Patrick Dillon Smyth, *Associate Clinical Professor of Surgery*
M.S. 1948, M.B., Ch.B. 1949, University College, Dublin; M.S. 1954, University of Michigan

Richard Saxon Snell, *Professor of Anatomy and of Orthopaedic Surgery*
M.B., B.S. 1949, Ph.D. 1955, M.D. 1961, University of London

Jerry Allison Snow, *Assistant Professor of Medicine*
B.A. 1961, University of the South; M.D. 1965, Washington University

Joseph Snyder, *Clinical Instructor in Ophthalmology*
B.A. 1958, University of Pennsylvania; M.D. 1962, Thomas Jefferson University

Jonas Sode, *Professor of Medicine*
M.D. 1951, University of Marburg

Edgar Henry Soifer, *Assistant Clinical Professor of Urology*
B.A. 1953, Washington and Jefferson College; M.D. 1957, New York University

Kevin Raymond Sorem, *Instructor in Health Care Sciences*
B.A. 1970, Rhode Island College; B.S. 1973, State University of New York at Stony Brook

Eleanor Attianese Sorrentino, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1958, Bryn Mawr College; M.D. 1962, Harvard University

Emilio Vicento Soto, *Special Lecturer in Child Health and Development*
B.S. 1926, M.D. 1934, University of Havana; M.D. in Ped. 1936, University of Pennsylvania

Peter Soyster, *Associate Clinical Professor of Obstetrics and Gynecology*
M.D. 1948, George Washington University

Samuel Vincent Spagnolo, *Assistant Professor of Medicine*
B.A. 1961, Washington and Jefferson College; M.D. 1965, Temple University

George Speck, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.S. 1937, University of Michigan; M.D. 1941, George Washington University

Israel Spector, *Clinical Instructor in Medicine*
B.S. 1958, City University of New York, Brooklyn College; M.D. 1962, University of Health Sciences/Chicago Medical School

Ian James Spence, *Assistant Clinical Professor of Urology*
B.S. 1955, Union College, New York; M.D. 1959, Albany Medical College of Union University

Paul Stephen Spiegler, *Clinical Instructor in Medicine*
B.A. 1960, New York University; M.D. 1969, George Washington University

Jeanne Spurlock, *Clinical Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
M.D. 1947, Howard University

Jorge Carlos Srabstein, *Assistant Professor of Child Health and Development and of Obstetrics and Gynecology*
M.D. 1966, University of Buenos Aires

Stephen Paul Staal, *Clinical Instructor in Health Care Sciences and in Medicine*
B.A. 1968, University of California, Los Angeles; M.D. 1972, University of California, San Diego

Raymond Standard, *Associate Clinical Professor of Medicine*
B.S. 1948, M.D. 1952, Howard University; M.P.H. 1967, Johns Hopkins University

William Stark, *Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1939, New York University; M.D. 1943, University of Louisville

Henry Joseph Starr, *Clinical Instructor in Ophthalmology*
B.A. 1955, Bowdoin College; M.D. 1959, Johns Hopkins University

Antonio Stazio, *Associate Clinical Professor of Neurology*
M.D. 1954, University of Naples

Edwin Arthur Steane, *Assistant Professorial Lecturer in Physiology*
B.S. 1966, University of Wisconsin—Milwaukee; Ph.D. 1974, George Washington University

Edward Steers, Jr., *Professorial Lecturer in Biochemistry*
B.S. 1959, Ph.D. 1963, University of Pennsylvania

Herbert Anton Steimel, *Assistant Clinical Professor of Surgery*
B.A. 1957, Syracuse University; M.D. 1960, State University of New York Upstate Medical Center

Arthur Harold Stein, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1962, Harvard University; M.D. 1966, Cornell University

Harry Calvin Stein, *Clinical Instructor in Otolaryngology*
B.S. 1961, Loyola College; M.D. 1965, University of Maryland

Walther Anthony Stein, *Instructor in Health Care Sciences*
B.S. 1973, State University of New York at Stony Brook

Harvey Steinberg, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1958, University of Pennsylvania; M.D. 1962, Thomas Jefferson University

Peter Joseph Steinglass, *Assistant Professor of Psychiatry and Behavioral Sciences and of Health Care Sciences*
B.A. 1960, Union College, New York; M.D. 1965, Harvard University

James Stengle, *Associate Professor of Medicine*
B.A. 1942, Oberlin College; M.D. 1946, Northwestern University

Melvin Joseph Stern, *Associate Clinical Professor of Medicine and of Psychiatry and Behavioral Sciences*
B.A. 1961, M.D. 1965, Yeshiva University

Harold Stevens, *Professor of Neurology*
B.S. 1933, Pennsylvania State University; M.A. 1934, Ph.D. 1937, M.D. 1941, University of Pennsylvania

Robert Glen Stevenson, Jr., *Special Lecturer in Epidemiology and Environmental Health*

Steele Fuller Stewart, Jr., *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1950, Carleton College; M.D. 1959, University of Pennsylvania

William James Stockton, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1956, University of Oklahoma

Frederick Jackson Stoddard, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1964, Bowdoin College; M.D. 1968, Case Western Reserve University

Myer Harold Stolar, *Clinical Professor of Medicine*
B.S. 1936, George Washington University; M.D. 1941, Georgetown University

Samuel Stoleru, *Clinical Instructor in Ophthalmology*
B.S. 1961, Colegio Hebreo Jorge Isaacs, Colombia; M.D. 1968, Universidad del Valle, Colombia

Belinda Crompton Straight, *Associate Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
M.D. 1952, New York University

*James Ashley Straw, *Associate Professor of Pharmacology*
B.S. 1958, Ph.D. 1963, University of Florida

Edward Michael Strehlau, *Special Lecturer in Epidemiology and Environmental Health*

Franklin Lyle Stroud, *Clinical Instructor in Child Health and Development*
B.S. 1961, University of Illinois at Urbana-Champaign; M.D. 1965, University of Illinois at the Medical Center

Vern Oscar Strubeck, Jr., *Special Lecturer in Pathology*
B.A. 1973, University of Montana

Donald Lee Sturtz, *Assistant Clinical Professor of Surgery*
B.S. 1955, U.S. Naval Academy; M.D. 1965, University of Pennsylvania

*On sabbatical leave spring semester, 1975.

John Sanders Sullivan, *Clinical Instructor in Epidemiology and Environmental Health*

Thomas Sullivan, *Assistant Clinical Professor of Child Health and Development*
B.A. 1960, M.D. 1964, Seton Hall University

Roberto Navarro Sunga, *Assistant Professor of Ophthalmology*
M.D. 1958, University of the Philippines

Earl Wilbur Sutherland III, *Assistant Professor of Health Care Sciences, of Medicine, of Pharmacology, and of Pathology (Laboratory Medicine)*
B.A. 1960, Ph.D., M.D. 1967, Case Western Reserve University

Jean Gibson Swartz, *Assistant Research Professor of Ophthalmology*
B.S. 1951, Madison College; M.S. 1957, Virginia Polytechnic Institute and State University; Ph.D. 1963, University of Colorado

John Peter Swope, *Assistant Professor of Anesthesiology*
B.S. 1958, U.S. Naval Academy; M.D. 1966, Georgetown University; M.S. 1970, Case Western Reserve University

Stephen Istvan Szara, *Associate Clinical Professor of Psychiatry and Behavioral Sciences (Psychopharmacology)*
Arbitur 1941, D.Sc. 1950, M.D. 1951, University of Budapest

Stanley Jerome Talpers, *Associate Clinical Professor of Medicine*
B.A. 1948, M.D. 1953, University of Colorado

John Alexis Lam Sang Tam, *Assistant Professor of Anesthesiology and of Child Health and Development*
M.B.B.S. 1967, University of Hong Kong

Irene Gorski Tamagna, *Professor of Medicine*
M.D. 1943, Medical College of Pennsylvania

Annop Tantisunthorn, *Clinical Instructor in Child Health and Development*
M.D. 1966, Tokyo Medical and Dental University

Nelson Monroe Tart, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.S. 1949, Wake Forest University; M.D. 1955, George Washington University

Lovisa Jansen Tatnall, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
M.D. 1937, Medical College of Pennsylvania; B.S. 1939, University of Washington

Norman Taub, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1937, M.D. 1941, University of Chicago

Joel Taubin, *Clinical Instructor in Medicine*
B.A. 1963, M.A. 1965, George Washington University; M.D. 1969, University of Virginia

Edith Taylor, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.S. 1945, Radcliffe College; M.D. 1949, Harvard University

Jack Borden Taylor, *Assistant Professor of Medicine*
B.S. 1961, Davidson College; M.D. 1965, Duke University

Wilson Lewis Taylor, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences (Experimental Psychology)*
B.A. 1930, Morningside College; M.A. 1937, University of Iowa; M.S. 1951, Tulane University of Louisiana; Ph.D. 1954, University of Illinois at Urbana-Champaign

Charles Franklin Tedford, *Assistant Clinical Professor of Radiology*
B.A. 1950, M.S. 1954, Southwest Texas State University

Francisco Tejada, *Assistant Professor of Medicine*
B.S. 1961, Universidad Nacional Mayor de San Marcos, Peru; M.D. 1967, Peruvian University Cayetano Heredia

Sarah Shtoffer Tenenblatt, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1942, M.D. 1944, University of California, Berkeley

Bernard Scott Teunis, *Assistant Clinical Professor of Surgery*
B.A. 1958, M.D. 1962, University of Virginia

Maung Htoon Thein, *Assistant Professor of Anesthesiology and of Child Health and Development*
M.B.B.S. 1967, Institute of Medicine I, Burma

Stanley William Theune, *Special Lecturer in Pathology*
B.S. 1966, Wisconsin State University

James Richard Thistlethwaite, *Clinical Professor of Surgery*
B.S. 1943, University of Richmond; M.D. 1947, Duke University

Frances Bagwell Thomas, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences (Social Work)*
B.A. 1961, M.S.W. 1963, University of North Carolina at Chapel Hill

Jerry Alan Thomas, *Clinical Instructor in Radiology*
B.S. 1969, M.S. 1970, University of Kansas

Lawrence Jay Thomas, *Associate Clinical Professor of Medicine*
B.S. 1934, New York University; M.D. 1938, George Washington University

Martin Alfred Thomas, *Assistant Clinical Professor of Radiology*
B.S. 1948, Purdue University; M.D. 1952, Indiana University at Indianapolis

Anne Marie Salmon Thompson, *Assistant Professor of Medicine*
B.A. 1963, Immaculata College, Pennsylvania; M.D. 1967, Thomas Jefferson University

Charles Waters Thompson, *Clinical Professor of Medicine*
M.D. 1941, George Washington University

Earle Brosius Thompson, *Assistant Clinical Professor of Medicine*
B.S. 1945, Franklin and Marshall College; M.D. 1945, University of Pennsylvania

Lewis William Thompson, *Associate Professor of Surgery and of Child Health and Development*
B.A. 1955, Asbury College; M.D. 1960, Wake Forest University

William Frederic Thompson, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1963, City University of New York, City College; M.D. 1967, George Washington University

George John Thorpe, *Assistant Clinical Professor of Medicine*
B.A. 1956, M.D. 1960, Case Western Reserve University

Charles Stanley Tidball, *Henry D. Fry Professor of Physiology and Research Professor of Medicine*
B.A. 1950, Wesleyan University; M.S. 1952, University of Rochester; Ph.D. 1955, University of Wisconsin—Madison; M.D. 1958, University of Chicago

*Mary Elizabeth Tidball, *Professor of Physiology*
B.A. 1951, Mount Holyoke College; M.S. 1955, Ph.D. 1959, University of Wisconsin—Madison; ScD. 1973, Wilson College; Sc.D. 1974, Trinity College, District of Columbia

George Tievsky, *Clinical Instructor in Radiology*
B.S. in Phar. 1939, M.D. 1943, George Washington University

Bruce Purdy Tinker, *Clinical Instructor in Medicine*
B.S. 1966, Michigan State University; M.D. 1971, Wayne State University

Donn Lloyd Tippett, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1947, Ohio State University

*On sabbatical leave 1974–75.

Evadne Marjorie Titer, *Clinical Instructor in Ophthalmology*
B.S. 1963, M.D. 1967, Howard University

Elijah White Titus, Jr., *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1952, George Washington University

Raymond Eugene Tobey, *Associate Professor of Anesthesiology*
B.A. 1954, Brown University; M.D. 1958, Tufts University

Jane Wendy Lehu Todaro, *Assistant Professor of Child Health and Development*
B.A. 1960, Vassar College; M.D. 1965, New York University

William Garland Tompkins, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1949, M.D. 1955, Howard University

Charles Eby Townsend, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1948, M.D. 1951, George Washington University

Carleton Raymond Treadwell, *Professor of Biochemistry*
B.A. 1934, Battle Creek College; M.S. 1935, Ph.D. 1939, University of Michigan

Howard Pettit Treichler, *Assistant Clinical Professor of Obstetrics and Gynecology*
M.D. 1946, George Washington University

Herman Thomas Trettel, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1971, St. Cloud State College

William MacLohon Trible, *Assistant Clinical Professor of Otolaryngology*
B.A. 1943, Princeton University; M.D. 1950, George Washington University; M.S. in Med. 1956, University of Pennsylvania

Charles Lawrence Trichilo, *Assistant Professorial Lecturer in Biochemistry*
B.A. 1968, M.Phil. 1971, Ph.D. 1971, George Washington University

Paul Emerson Trievel, *Special Lecturer in Epidemiology and Environmental Health*

Gordon Anderson Tripp, *Assistant Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1957, Harvard University; M.D. 1961, Duke University

Edward Byrd Truitt, Jr., *Research Professor of Pharmacology*
B.S. 1943, Medical College of Virginia of Virginia Commonwealth University; Ph.D. 1950, University of Maryland

Nelson Perez Trujillo, *Associate Clinical Professor of Medicine*
B.S. 1955, Baldor Academy, Cuba; M.D. 1962, Tulane University of Louisiana

Neofytos Theodore Tsangaris, *Associate Professor of Surgery*
B.S. 1952, Duke University; M.D. 1956, George Washington University

Mark On-Man Ts'o, *Associate Research Professor of Ophthalmology*
M.B., B.Surg. 1961, University of Hong Kong

Bruce Irwin Turner, *Clinical Instructor in Urology*
M.D. 1967, Tulane University of Louisiana

Lena Feinstein Turner, *Special Lecturer in Pathology*

Maria Lourdes Turner, *Assistant Clinical Professor of Dermatology*
B.S. 1958, M.D. 1961, University of the Philippines

Raymond William Turner, *Assistant Clinical Professor of Medicine*
B.A. 1954, Amherst College; M.D. 1958, Yale University

Arthur Richard Ugel, *Clinical Instructor in Dermatology and in Child Health and Development*
B.S. 1961, M.D. 1965, George Washington University

Herbert Andrew Urweider, *Assistant Clinical Professor of Ophthalmology*
B.A. 1954, Bowdoin College; M.D., C.M. 1958, McGill University

George Vartkes Vahouny, *Professor of Biochemistry*
B.S. 1953, M.S. 1955, Ph.D. 1958, George Washington University

Martin John Valaske, *Professor of Pathology*
Ph.B. 1950, M.D. 1954, Marquette University

John Miller Van Buren, *Clinical Professor of Neurological Surgery*
B.A. 1943, Dartmouth College; M.D. 1947, Columbia University; M.S. 1950, McGill University; Ph.D. 1961, George Washington University

Robert James Van Houten, *Professor of Anesthesiology*
B.S. 1950, Albright College; M.D. 1954, Hahnemann Medical College

Anna Maria Louize Van Rooy, *Clinical Instructor in Obstetrics and Gynecology*
M.D. 1953, University of Utrecht

Vijay Mohan Varma, *Associate Professor of Radiology*
M.B., B.S. 1958, Osmania University; M.D. 1963, All India Institute of Medical Sciences

Jean Tierney Vazuka, *Assistant Professor of Health Care Sciences and of Psychiatry and Behavioral Sciences*
B.A. 1946, Bucknell University; M.D. 1962, Temple University

Paul Guerin Ventry, *Assistant Clinical Professor of Medicine*
B.S. 1957, Manhattan College; M.D. 1962, State University of New York Upstate Medical Center

Leonard Louis Vertuno, *Assistant Professor of Medicine*
B.S. 1961, M.D. 1964, Northwestern University

Theodore Villafaña, *Assistant Professor of Radiology*
B.A. 1959, City University of New York, Hunter College; M.S. 1965, University of Pittsburgh; Ph.D. 1969, Johns Hopkins University

John Vinyard, Jr., *Assistant Clinical Professor of Epidemiology and Environmental Health*
B.S. 1949, M.S. 1950, University of Missouri—Columbia; M.P.H. 1953, University of California, Berkeley

Brantley Paul Vitek, *Assistant Clinical Professor of Orthopaedic Surgery*
B.A. 1957, Western Maryland College; M.D. 1961, University of Maryland

Boris George Vlalukin, *Clinical Instructor in Medicine*
M.D. 1961, University of Belgrade

James Wells Voell, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1959, Marquette University

Carl Marvin Voyles, *Associate Professor of Medicine*
B.S. 1945, College of William and Mary; M.D. 1945, Duke University

Ralph Weyman Wadeson, Jr., *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1947, University of Alabama in Birmingham

Francis Neil Waldrop, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1946, University of Minnesota; M.D. 1950, George Washington University

Jerome Aloysius Waliszewski, *Special Lecturer in Radiology (Nuclear Medicine)*

Glenn Anthony Walker, *Associate Professor of Biochemistry*
B.A. 1958, Bellarmine College; Ph.D. 1963, Michigan State University

William Davies Wallace, Jr., *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1949, Westminster College, Pennsylvania; M.D. 1953, Thomas Jefferson University

Bernard John Walsh, *Special Lecturer in Child Health and Development*
B.S. 1932, M.D. 1934, Georgetown University

James Christopher Walsh, *Associate Clinical Professor of Obstetrics and Gynecology*
B.A. 1941, M.D. 1945, Georgetown University

Richard John Walsh, *Clinical Instructor in Pathology (Laboratory Medicine)*
B.S. 1971, Pennsylvania State University

Max Graff Walten, Jr., *Clinical Instructor in Child Health and Development*
B.A. 1960, Columbia University; M.D. 1965, University of Virginia

Donald Walters, *Associate Clinical Professor of Obstetrics and Gynecology*
B.S. 1939, M.D. 1943, University of Virginia

Ching-Te Wang, *Special Lecturer in Pathology*
Ph.D. 1971, University of Illinois, Chicago

David Murray Wanicur, *Clinical Instructor in Ophthalmology*
B.A. 1961, University of Pennsylvania; M.D. 1965, University of Pittsburgh

Archibald Ward, Jr., *Associate Clinical Professor of Psychiatry and Behavioral Sciences (Sociology)*
B.S. 1933, North Carolina State University at Raleigh; B.D. 1937, Crozer Theological Seminary; Ph.D. 1947, University of Maryland

Robert Edward Ware, *Assistant Clinical Professor of Urology*
M.D. 1953, Medical College of Virginia of Virginia Commonwealth University

Michelle Palmieri Warren, *Assistant Professor of Obstetrics and Gynecology and of Medicine*
B.A. 1961, Mount Holyoke College; M.D. 1965, Cornell University

Elzberry Waters, Jr., *Assistant Research Professor of Medical and Public Affairs*
B.A. 1963, M.A. 1965, George Washington University; Ph.D. 1973, American University

Don Wayne Watkins, *Assistant Professor of Physiology*
B.Ch.E. 1963, University of Louisville; Ph.D. 1968, University of Wisconsin—Madison

Benny Waxman, *Associate Professor of Obstetrics and Gynecology*
M.D. 1957, University of Western Ontario

Kenneth Earl Weaver, *Clinical Instructor in Radiology (Radiologic Physics)*
B.S. 1966, California State University, Los Angeles; M.S. 1968, Oregon State University

Blair McWhorter Webb, *Assistant Clinical Professor of Otolaryngology and of Child Health and Development*
B.S. 1951, Hampden-Sydney College; M.D. 1955, University of Virginia

Russell Ellenwood Webber, Jr., *Special Lecturer in Epidemiology and Environmental Health*

William Farnsworth Weber, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1962, Yale University

Thomas Glenn Webster, *Professor of Psychiatry and Behavioral Sciences*
B.A. 1946, Fort Hays Kansas State College; M.D. 1949, Wayne State University

Bryant Wedge, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
M.D. 1945, University of Michigan

William Joseph Weiler, *Special Lecturer in Radiology*

Hans Weil-Malherbe, *Associate Clinical Professor of Psychiatry and Behavioral Sciences (Neurochemistry)*
M.D. 1929, University of Heidelberg; M.S. 1940, D.Sc. 1945, University of Durham

Daniel Weiner, *Associate Professor of Medicine*
B.A. 1957, M.S., M.D. 1962, University of Minnesota

Harold Weiner, *Clinical Professor of Psychiatry and Behavioral Sciences (Experimental Psychology)*
B.B.A. 1953, City University of New York, City College; M.A. 1957, Ph.D. 1960, University of Maryland

Allan Byrne Weingold, *Professor of Obstetrics and Gynecology*
B.A. 1951, Oberlin College; M.D. 1955, New York Medical College

Jacob Joseph Weinstein, *Assistant Clinical Professor of Surgery*
Phar.G. 1930, B.S. 1934, M.D. 1936, University of Maryland

Herbert Weintraub, *Professor of Anesthesiology*
B.A. 1950, New York University; M.A. 1958, B.M., B.Ch. 1959, University of Oxford

Paul Stephen Weisberg, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1952, Harvard University; M.D. 1958, Marquette University

Ira Paul Weiss, *Assistant Professorial Lecturer in Child Health and Development and in Physiology*
B.S. 1965, City University of New York, City College; Ph.D. 1969, Syracuse University

Lowell Martin Weiss, *Associate Clinical Professor of Medicine*
B.S. 1957, Rutgers University, New Brunswick; M.D. 1962, George Washington University

Stephen Weissman, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1959, Cornell University; M.D. 1963, Yeshiva University

Isaac Weiszer, *Clinical Instructor in Medicine*
B.S. 1956, University of Illinois at Urbana-Champaign; M.D. 1960, University of Illinois at the Medical Center

James Lansing Wellhouse, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1948, University of Iowa; M.D. 1952, Washington University

Louis Wener, *Clinical Instructor in Radiology*
M.D. 1956, University of Tennessee Medical Units

Don Wenger, *Associate Clinical Professor of Surgery*
B.A. 1934, University of Wisconsin—Madison; M.D. 1937, Marquette University; M.S. 1956, Georgetown University; J.D. 1962, George Washington University

Mario Werner, *Professor of Pathology (Laboratory Medicine)*
M.D. 1960, University of Zurich

Stanley Gerald Werner, *Assistant Clinical Professor of Child Health and Development*
B.S. 1948, Stanford University; B.A. 1950, University of Illinois at Urbana-Champaign; M.D. 1952, University of Illinois at the Medical Center

Gloria Ruth Goldsmith Werth, *Assistant Clinical Professor of Medicine*
B.A. 1949, Goucher College; M.D. 1953, Johns Hopkins University

Ezell Westbrook, *Clinical Instructor in Radiology*

Jean Kendrick Weston, *Adjunct Professor of Clinical Engineering*
B.A. 1930, M.S. 1931, University of Michigan; Ph.D. 1933, M.D. 1941, Temple University

Kathleen Shingler Weston, *Associate Professorial Lecturer in Anatomy*
B.A. 1929, Northern Michigan University; M.A. 1934, University of Michigan; M.D. 1951, Temple University

John Raymond Whiteman, *Assistant Research Professor of Medicine*
M.D. 1967, George Washington University

Henry Sindos Wicker, *Assistant Clinical Professor of Ophthalmology*
B.S. 1948, Xavier University of Louisiana; M.D. 1953, Howard University

Robert Shaw Wilkinson, *Associate Clinical Professor of Medicine*
B.A. 1950, Dartmouth College; M.D. 1955, New York University

Ann Lottie Barnett Williams, *Clinical Instructor in Medicine*
M.B.B.S. 1965, University of London; D.M.R.C.S., L.R.C.P. 1965, Royal College of Physicians and Surgeons; D.Obst.R.C.O.G. 1966, Royal College of Obstetric and Gynecologists

Hiram Stephen Williams, *Clinical Instructor in Child Health and Development*
B.A. 1963, Stanford University; M.D. 1970, Johns Hopkins University

Jonathan Marshall Williams, *Clinical Professor of Neurological Surgery*
B.S. in Med. 1936, Loyola University of Chicago; M.D. 1938, University of Chicago

Marjorie Joan Williams, *Assistant Clinical Professor of Pathology*
M.D. 1943, University of Bristol

Elliot Charles Wilner, *Clinical Instructor in Neurology*
B.A. 1958, Columbia University; M.D. 1962, George Washington University

David Quinn Wilson, *Professor of Orthopaedic Surgery*
M.D. 1950, University of Southern California

Thomas Ashton Wilson, *Associate Clinical Professor of Obstetrics and Gynecology*
B.A. 1942, M.D. 1944, George Washington University

Alan William Winshel, *Assistant Clinical Professor of Obstetrics and Gynecology*
B.A. 1948, Temple University; M.D. 1952, Hahnemann Medical College

Herbert Saul Winston, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1953, Harvard University; M.D. 1957, Yale University

Karl Wipplinger, *Associate Professor of Medicine*
M.D. 1953, University of Vienna

James Howard Wise, *Assistant Professor of Child Health and Development*
B.A. 1963, Adelphi University; M.A. 1965, Ph.D. 1969, George Washington University

Jarrett Michael Wise, *Assistant Professor of Health Care Sciences*
B.S. in A.H.S. 1971, Duke University

Meade Graham Withrow, Jr., *Special Lecturer in Radiology*

Philip Witorsch, *Associate Professor of Medicine*
B.A. 1958, M.D. 1962, New York University

Jeffrey Francis Witte, *Clinical Instructor in Orthopaedic Surgery*
B.A. 1963, Georgetown University; M.D. 1967, University of Michigan

Paul Frederick Wohlford, *Associate Clinical Professor of Child Health and Development and of Psychiatry and Behavioral Sciences*
B.A. 1959, Harvard University; Ph.D. 1964, Duke University

Muriel Ruth DuBrow Wolf, *Associate Professor of Child Health and Development*
B.A. 1957, Smith College; M.D. 1959, Yale University

Stanley Irving Wolf, *Associate Clinical Professor of Child Health and Development*
B.S. 1947, M.D. 1948, Georgetown University

Martin Samuel Wolfe, *Associate Clinical Professor of Medicine*
B.A. 1957, M.D. 1961, Cornell University; D.C.M.T. 1967, London School of Hygiene and Tropical Medicine

Frederick William Wolff, *Professor of Medicine*
M.B., B.S. 1946, M.D. 1957, University of Durham

Steven Joel Wolin, *Assistant Clinical Professor of Medicine and of Psychiatry and Behavioral Sciences*
B.A. 1962, Brown University; M.D. 1966, Yeshiva University

Michael Aime Woodbury, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
Ph.B. 1942, University of Paris; B.A. 1945, M.D. 1951, Harvard University

Sylvia Bernice Wood Wooten, *Assistant Clinical Professor of Child Health and Development*
B.S. 1963, Morgan State College; M.D. 1967, Howard University

Henry Harcus Work, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1933, Hamilton College; M.D. 1937, Harvard University

Creighton Bolter Wright, *Associate Professor of Surgery*
B.S. 1961, M.D. 1965, Duke University

Frederick S. Wright, *Special Lecturer in Pathology*

Alvin Charles Wyman, *Clinical Professor of Radiology*
B.A. 1939, Cornell University; M.D. 1943, New York University

Ronald Wynn, *Special Lecturer in Epidemiology and Environmental Health*

Jean Haroutian Yacoubian, *Associate Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1947, M.D. 1951, American University of Beirut

William Shigeru Yamamoto, *Professor of Clinical Engineering*
B.A. 1945, Park College; M.D. 1949, M.A. 1971, University of Pennsylvania

Harold Taylor Yates, *Associate Clinical Professor of Child Health and Development*
M.D. 1941, University of Virginia

Harold Taylor Yates, Jr., *Assistant Clinical Professor of Child Health and Development*
B.A. 1964, University of Virginia; M.D. 1969, Medical College of Virginia of Virginia Commonwealth University

Leon Yochelson, *Professor of Psychiatry and Behavioral Sciences*
B.A. 1938, M.D. 1942, State University of New York at Buffalo

Samuel Yochelson, *Clinical Professor of Psychiatry and Behavioral Sciences (Criminal Behavior)*
B.S. 1926, M.A. 1927, State University of New York at Buffalo; Ph.D. 1930, M.D. 1936, Yale University

Michael Winston Yocum, *Assistant Professor of Medicine*
B.A. 1965, Indiana University of Bloomington; M.D. 1968, Indiana University at Indianapolis

Stanley Yolles, *Clinical Professor of Psychiatry and Behavioral Sciences*
B.A. 1939, City University of New York, Brooklyn College; M.A. 1940, Harvard University; M.D. 1950, New York University; M.P.H. 1957, Johns Hopkins University

Delosa Anthony Young, *Clinical Instructor in Child Health and Development*
B.A. 1959, Loyola University, New Orleans; M.D. 1962, Louisiana State University Medical Center

Ira Sanders Young, *Assistant Clinical Professor of Urology*
B.A. 1955, Lafayette College; M.D. 1959, George Washington University

William Hurlburt Young, Jr., *Assistant Clinical Professor of Psychiatry and Behavioral Sciences*
B.S. 1942, Harvard University; M.D. 1945, University of Michigan

Hanna Samir Zakharia, *Assistant Professor of Ophthalmology*
B.S. 1964, M.D. 1968, American University of Beirut

Bernard Harold Zeavin, *Assistant Clinical Professor of Ophthalmology*
M.D. 1950, University of Manitoba

Jack Arnold Zeller, *Assistant Professor of Pathology (Laboratory Medicine)*
B.A. 1960, Columbia University; M.D. 1964, New York Medical College

Alan Barry Zients, *Assistant Clinical Professor of Psychiatry and Behavioral Sciences and of Child Health and Development*
B.A. 1959, Dartmouth College; M.D. 1963, New York University

Barbara Anne Smith Zimmerman, *Clinical Instructor in Pathology (Laboratory Medicine)*

Ernest Michael Zimmerman, *Clinical Instructor in Ophthalmology*
M.D. 1963, University of Toronto

Hyman Joseph Zimmerman, *Professor of Medicine*
B.A. 1936, University of Rochester; M.A. 1938, M.D. 1942, Stanford University

Jack Evans Zimmerman, *Assistant Professor of Anesthesiology and of Medicine*
B.S. 1960, University of Maryland; M.D. 1964, George Washington University

Lorenz Eugene Zimmerman, *Clinical Professor of Ophthalmology and of Ophthalmic Pathology*
B.A. 1943, M.D. 1945, George Washington University

Mervin Harvey Zimmerman, *Assistant Clinical Professor of Ophthalmology*
M.D. 1959, University of Toronto

John Zinner, *Associate Professor of Psychiatry and Behavioral Sciences*
B.A. 1958, Amherst College; M.D. 1963, Harvard University

Howard James Zirkin, *Assistant Clinical Professor of Pathology*
B.A. 1961, M.S. 1963, Case Western Reserve University; M.D. 1968, Wayne State University

Bernard Charles Zook, *Associate Professor of Pathology (Comparative)*
B.S. 1962, D.V.M. 1963, Colorado State University

William John Zukel, *Associate Clinical Professor of Epidemiology and Environmental Health*
B.S. 1943, University of Massachusetts—Amherst; M.D. 1947, Hahnemann Medical College; Dr.P.H. 1961, London School of Hygiene and Tropical Medicine

Assistants in Research and Instruction 1974–75

Olajide Agbede, *Teaching Fellow in Microbiology*
B.S. 1971, M.S. 1972, Howard University

Brent Roger Ain, *Assistant in Orthopaedic Surgery*
B.A. 1967, University of Rochester; M.D. 1972, Tulane University

David Akman, *Assistant in Medicine (Cardiology)*
B.S. 1964, M.D. 1968, McGill University

James David Alford, *Assistant in Thoracic Surgery*
B.A. 1959, University of North Carolina; M.D. 1966, University of North Carolina

Katherine Louise Alley, *Assistant in Surgery*
B.A. 1970, University of Arkansas; M.D. 1974, George Washington University

Richard Slee Altman, *Assistant in Medicine*
B.A. 1970, Franklin and Marshall College; M.D. 1974, George Washington University

Roger Amick, *Assistant in Surgery*
B.A. 1970, Marshall University; M.D. 1974, George Washington University

Bruce Jorge Ammerman, *Assistant in Neurological Surgery*
B.A. 1968, Case Western Reserve University; M.D. 1972, George Washington University

Irwin Stanley Anderson, *Fellow in Medicine (Hematology)*
B.S. 1962, M.D. 1966, Howard University

Un Hun Ang, *Fellow in Medicine (Pulmonary Diseases)*
M.D. 1967, University of the East, Philippines

Rodney Alan Appell, *Assistant in Surgery*
B.A. 1969, Franklin and Marshall College; M.D. 1973, Jefferson University

Martin E. Applebaum, *Assistant in Radiology*
B.S. 1964, Hobart College; M.D. 1971, University of Louvain, Belgium

Abel Arakaky, *Fellow in Medicine (Nephrology)*
B.A. 1952, M.D. 1958, University of La Paz, Bolivia

Azucena Lagumbay Arguelles, *Assistant in Pathology*
B.A. 1958, M.D. 1963, University of Santo Tomas, Manila

Pratibha Arora, *Assistant in Physical Medicine and Rehabilitation*
F.S.C. 1958, S.M. College, India; M.B.B.S. 1964, S.N. Medical College, India

Abbas Bahrololoom, *Assistant in Anesthesiology*
M.D. 1961, Mashhad University, Iran

Susan Hazel Bane, *Assistant in Medicine*
B.A. 1968, M.D. 1974, George Washington University

Herbert Baraf, *Assistant in Medicine*
B.A. 1967, University of Michigan; M.D. 1973, State University of New York Downstate Medical Center

Ramez Bassir, *Fellow in Clinical Engineering*
M.D. 1969, Nagoya University

Michael Edgar Beall, *Assistant in Urology*
B.A. 1968, Ohio Wesleyan University; M.D. 1972, George Washington University

Alan Benjamin Bergman, *Assistant in Medicine*
B.A. 1969, New York University; M.D. 1973, Rush Medical College

Eric Charles Bergman, *Assistant in Psychiatry and Behavioral Sciences*
B.A. 1968, Duke University; M.D. 1973, University of Pennsylvania

Michael Enrico Bernardino, *Assistant in Medicine*
B.A. 1969, Case Western Reserve University; M.D. 1973, Ohio State University

Richard Dennis Bertken, *Assistant in Medicine*
B.S. 1968, University of Southern California; M.D. 1972, University of California, Los Angeles

Charles Joel Bier, *Assistant in Medicine*
B.A. 1965, M.D. 1968, George Washington University

Helga Binder, *Assistant in Medicine (Physical Medicine and Rehabilitation)*
M.D. 1957, Berlin Humboldt University, Germany

Kathleen Asyia Bis, *Assistant in Obstetrics and Gynecology*
B.S. 1968, M.D. 1972, George Washington University

Norman Bishop, *Assistant in Anesthesiology*
B.S. 1969, M.D. 1973, George Washington University

James Blake, *Assistant in Medicine*
B.S. 1968, M.D. 1972, University of Southern California

Robert Leslie Bloom, *Assistant in Medicine*
B.S. 1969, M.D. 1973, Tufts University

Richard Harvey Blum, *Assistant in Medicine*
B.S. 1970, Yale University; M.D. 1974, Temple University

Felicidad Cabahug Boholost, *Assistant in Pathology*
B.A. 1960, Southwestern University, Cebu, Philippines; M.D. 1963, Cebu Institute of Technology

George Robert Bowers, *Assistant in Medicine*
B.A. 1969, Gettysburg College; M.D. 1972, Medical College of Virginia of Virginia Commonwealth University

Joel Bruce Bowers, *Assistant in Radiology*
B.A. 1965, University of Vermont; M.D. 1969, State University of New York at Buffalo

Michael Brancaccio, *Assistant in Pathology*
B.S. 1967, Fairfield University; M.D. 1971, George Washington University

Howard London Brilliant, *Assistant in Orthopaedic Surgery*
B.A. 1964, Cornell University; M.D. 1968, University of Chicago

Barry Greg Brotman, *Assistant in Radiology*
B.A. 1967, M.D. 1971, State University of New York at Buffalo

Paul Stephen Burka, *Assistant in Obstetrics and Gynecology*
B.A. 1969, University of Virginia; M.D. 1974, Georgetown University

Samuel Burstein, *Assistant in Medicine*
B.S. 1968, University of Pittsburgh; M.D. 1972, Boston University

Robert Brentwood Bux, *Assistant in Urology*
B.A. 1965, University of Texas at Austin; M.D. 1969, Tulane University of Louisiana

John Leo Caldwell, *Assistant in Radiology*
M.D. 1968, University of Maryland

Thomas Ralph Callihan, *Assistant in Pathology*
B.A. 1969, Kenyon College; M.D. 1973, George Washington University

Alan Cashell, *Fellow in Microbiology*

Martin Ceaser, *Assistant in Psychiatry and Behavioral Sciences*
B.A. 1965, Kenyon College; M.D. 1969, Case Western Reserve University

Thomas Chen, *Fellow in Biochemistry*
B.A. 1973, Lake Forest College

Kathleen Francis Cheyney, *Assistant in Surgery*
B.A. 1970, Ohio Wesleyan University; M.D. 1974, Jefferson Medical College

John Chidester, *Assistant in Orthopaedic Surgery*
B.A. 1966, Princeton University; M.D. 1970, University of Pennsylvania

Dai Cho, *Assistant in Anesthesiology*
B.S. 1964, M.D. 1968, Catholic Medical College, Korea

Kwang Ja Chun, *Assistant in Nuclear Medicine*
B.A. 1964, M.D. 1968, Seoul National University

Hyo Sook Chung, *Assistant in Medicine (Physical Medicine and Rehabilitation)*
M.D. 1961, Woo Sok University, Korea

Mark Ira Cinnamon, *Assistant in Medicine*
B.A. 1968, Ohio State University; M.D. 1972, State University of New York Downstate Medical Center

Charles Michael Citrin, *Assistant in Neuroradiology*
B.A. 1966, Indiana University at Bloomington; M.D. 1970, State University of New York Downstate Medical Center

William Anthony Colom, *Assistant in Medicine*
B.S. 1968, Washington and Lee University; M.D. 1973, Temple University

Richard Cooper, *Assistant in Radiology*
B.A. 1964, Cornell University; M.D. 1968, University of Chicago

Wayne Douglas Cooper, *Assistant in Obstetrics and Gynecology*
B.A. 1969, Alfred University; M.D. 1973, George Washington University

Paul Joseph Corso, *Assistant in Thoracic Surgery*
B.A. 1965, M.D. 1969, George Washington University

Vincent Cotroneo, *Assistant in Radiology*
B.A. 1966, Canisius College; M.D. 1970, State University of New York at Buffalo

John Albert Cowin, *Assistant in Orthopaedic Surgery*
B.A. 1968, Gettysburg College; M.D. 1972, George Washington University

Dianne Louise Cresswell, *Assistant in Obstetrics and Gynecology*
B.S. 1968, Muskingum College; M.D. 1973, George Washington University

George Franklin Cresswell, *Assistant in Psychiatry and Behavioral Sciences*
B.A. 1970, Washington and Lee University; M.D. 1974, George Washington University

Llewelyn Crooks, *Assistant in Obstetrics and Gynecology*
B.S. 1969, M.D. 1973, Howard University

Stanley Gramch Crossland, *Assistant in Surgery*
B.S. 1967, University of Richmond; M.D. 1971, George Washington University

David Ralph Curfman, *Assistant in Neurological Surgery*
B.A. 1965, Columbia Union College; M.S. 1967, M.D. 1973, George Washington University

Jahingir Cyrus, *Fellow in Medicine (Endocrinology)*
M.D. 1969, University of Tehran

Stephen Pinkney Daines, *Assistant in Obstetrics and Gynecology*
B.S. 1970, Utah State University; M.D. 1972, George Washington University

Timothy Paul Daly, *Assistant in Orthopaedic Surgery*
B.A. 1965, LaSalle College; M.D. 1970, University of Maryland

Paul Hartman D'Amato, *Assistant in Medicine*
B.A. 1965, Rutgers University, New Brunswick; M.D. 1969, George Washington University

Ioannis Danielides, *Assistant in Medicine*
M.D. 1971, University of Athens

Morgan Delaney, *Assistant in Medicine*
B.A. 1967, M.D. 1971, University of Virginia

Francis DeLuca, *Assistant in Orthopaedic Surgery*
B.A. 1967, Rutgers University, New Brunswick; M.D. 1971, Hahnemann Medical College

Paul Leslie DeWitt, *Assistant in Surgery*
M.D. 1968, George Washington University

Carlos Ricardo Diaz, *Assistant in Medicine*
B.A. 1968, Johns Hopkins University; M.D. 1972, George Washington University

Sebastion James Dispenza, *Assistant in Obstetrics and Gynecology*
B.S. 1967, Belmont Abbey College; M.D. 1974, University of Virginia

Walter James Douglass, *Assistant in Medicine*
B.S. 1969, M.D. 1973, University of South Carolina

Michael Paul Duncombe, *Assistant in Neurology*
B.S. 1968, Ohio State University; M.D. 1972, University of Pittsburgh

Jacob Gordon Edelson, *Assistant in Orthopaedic Surgery*
B.A. 1962, Wesleyan University; M.A. 1963, Harvard University; M.D. 1970, Yale University

Deborah Susan Edge, *Assistant in Medicine*
B.S. 1970, Tufts University; M.D. 1974, Northwestern University Medical School

John David Edmiston II, *Assistant in Ophthalmology*
B.A. 1968, Washington University; M.D. 1972, University of Arkansas

Barry Jay Efros, *Assistant in Medicine*
B.A. 1970, George Washington University; M.D. 1974, New Jersey Medical School

Norman Einstein, *Assistant in Medicine*
B.A. 1969, Rutgers University, New Brunswick; M.D. 1973, Tufts University

Howard Jay Eisen, *Assistant in Medicine (Gastroenterology)*
B.A. 1964, M.D. 1969, Harvard University

Thomas B. Elliott, *Fellow in Microbiology*

Neils Cary Engleberg, *Assistant in Medicine*
B.S. 1970, M.D. 1974, George Washington University

Beverly Jane Everett, *Teaching Fellow in Microbiology*
B.S. 1973, Mt. Allison University

Mary Huey Wei Fang, *Assistant in Medicine*
B.S. 1971, University of Maryland; M.D. 1974, Medical College of Virginia of Virginia Commonwealth University

Nasvollah Fatehi, *Assistant in Neurological Surgery*
M.D. 1968, University of Tehran

Jalal Fatemi, *Fellow in Medicine (Hematology)*
M.D. 1966, Tehran University, India

Annette Williams Felix, *Assistant in Ophthalmology*
B.S. 1969, University of Illinois at Urbana-Champaign; M.D. 1973, University of Illinois at the Medical Center

Joseph Finizio, *Assistant in Radiology*
B.S. 1966, Hillsdale College; M.D. 1971, Georgetown University

Jack Fisher, *Assistant in Surgery*
B.S. 1969, University of Illinois at Urbana-Champaign; M.D. 1973, Emory University

Norman Fizette, *Assistant in Clinical Pathology*
B.S. 1960, Stetson University; M.S. 1964, Vanderbilt University; M.D. 1971, Medical College of Virginia of Virginia Commonwealth University

Jean Long Fourcroy, *Assistant in Surgery*
B.A. 1964, San Jose State College; M.D. 1974, Medical College of Pennsylvania

Cleveland Francis, Jr., *Assistant in Medicine*
B.S. 1967, Southern University and Agricultural and Mechanical College; M.D. 1973, Medical College of Virginia of Virginia Commonwealth University

Martin Jeffrey Frank, *Assistant in Medicine (Cardiology)*
B.A. 1966, Rutgers University, New Brunswick; M.D. 1970, New York Medical College

Robert Saul Frankel, *Assistant in Radiology*
B.A. 1966, Washington and Jefferson College; M.D. 1970, Case Western Reserve University

Mary A. Frey, *Fellow in Physiology*

Richard Bruce Friedman, *Assistant in Medicine*
B.S. 1968, State University of New York at Albany; M.D. 1972, State University of New York Downstate Medical Center

Melinda Miller Gardner, *Assistant in Medicine*
B.A. 1965, Duke University; M.D. 1974, George Washington University

Ronald J. Garson, *Assistant in Psychiatry and Behavioral Sciences*
B.A. 1971, Columbia University; M.D. 1974, University of Pennsylvania

Robert Allan Gatlin, *Assistant in Obstetrics and Gynecology*
B.A. 1969, Stanford University; M.D. 1973, George Washington University

Sreehari Gazula, *Assistant in Anesthesiology*
M.B.B.S., 1963, Lutheran Multipurpose School, Gunter, India; M.D. 1969, Gunter Medical College, India

Glenn Geelhoed, *Assistant in Surgery*
B.A., B.S. 1964, Calvin College; M.D. 1968, University of Michigan

John Paul Gens, Jr., *Assistant in Surgery*
B.S. 1967, Trinity College, Connecticut; M.D. 1971, George Washington University

Victoria Cobb Gerhart, *Assistant in Anesthesiology*
B.A. 1970, M.D. 1974, University of Iowa

Daniel B. Goldberg, *Assistant in Medicine*
B.A. 1970, University of California; M.D. 1974, State University of New York

Frank Goldberg, *Assistant in Medicine*
B.A. 1968, University of North Carolina at Chapel Hill; M.D. 1972, New York University

Samuel David Goldberg, *Assistant in Medicine (Cardiology)*
B.A. 1965, Franklin and Marshall College; M.D. 1969, University of Maryland

Arnold Lewis Goldstein, *Assistant in Medicine*
B.S. 1969, M.D. 1973, Pennsylvania State University

Ronald Claude Goren, *Assistant in Medicine*
B.A. 1969, University of Pennsylvania; M.D. 1973, Temple University

Barry Charles Gorman, *Assistant in Psychiatry and Behavioral Sciences*
B.S. 1967, Tufts University; M.D. 1971, George Washington University

Barbara Ann Gots, *Assistant in Ophthalmology*
B.A. 1964, Temple University; M.D. 1973, University of Southern California

Jed Gould, *Assistant in Obstetrics and Gynecology*
B.S. 1969, University of Maryland; M.D. 1973, Georgetown University

Robert Donald Grant, *Assistant in Medicine*
B.A. 1968, University of California, Berkeley; M.D. 1972, University of California, San Francisco

Sanford Alan Greenhouse, *Assistant in Medicine*
B.A. 1969, City University of New York, Brooklyn College; M.D. 1973, Medical College of Virginia of Virginia Commonwealth University

James Stanley Grissom, *Assistant in Medicine*
B.A. 1969, Millikin University; M.D. 1973, University of Colorado

Peter Leonard Gross, *Assistant in Urology*
B.S. 1963, Hobart College; M.D. 1968, New York University

Joyce Piccario Hair, *Assistant in Medicine*
B.A. 1970, Hood College; M.D. 1974, George Washington University

Lloyd Eric Halvorson, *Assistant in Medicine*
B.S. 1969, Wake Forest University; M.D. 1973, Medical College of Virginia of Virginia Commonwealth University

Ernest Dalton Hanowell, *Assistant in Surgery*
B.S. 1969, University of California, Davis; M.D. 1973, George Washington University

Jane Sharon Hanscom, *Assistant in Surgery*
B.A. 1967, University of Maine at Orono; M.D. 1971, George Washington University

Denis Robert Harris, *Assistant in Orthopaedic Surgery*
B.S. 1968, M.D. 1972, University of Wisconsin—Madison

Paul Gabor Harsanyi, *Fellow in Radiology*
B.A. 1957, Miskolc College, Hungary; M.D. 1962, University of Budapest

William J. Hatch, *Fellow in Physiology*
B.S. 1970, Brigham Young University

Clara Szczupak Heffess, *Assistant in Pathology*
M.D. 1965, University of Buenos Aires, Argentina

Roberta Katlin Helfgott, *Assistant in Radiology*
B.S. 1968, Simmons College; M.D. 1972, George Washington University

Raul Hemb, *Assistant in Medicine (Cardiology)*
M.D. 1968, Faculdade de Medicina de Porto Alergre, Brazil

Stephen Charles Hershey, *Assistant in Psychiatry and Behavioral Sciences*
B.S. 1966, M.D. 1970, University of Michigan

Phillip Hill, *Assistant in Psychiatry and Behavioral Sciences*
B.A. 1968, Ball State University; M.D. 1972, Indiana University at Indianapolis

Michael Harold Hitchcock, *Assistant in Neurological Surgery*
B.A. 1965, University of Minnesota; M.D. 1969, George Washington University

John Sanford Holmes, *Assistant in Orthopaedic Surgery*
B.A. 1967, California State University, Northridge; M.D. 1971, George Washington University

Klara Horvath, *Assistant in Radiology*
M.D. 1968, University of Budapest

Donna M. Hrushesky, *Fellow in Health Care Sciences (Family Medicine)*
B.A. 1969, Syracuse University; M.D. 1973, State University of New York at Buffalo

Sands Kenyon Irani, *Assistant in Medicine (Gastroenterology)*
B.A. 1963, University of the South; M.D. 1968, George Washington University

Paul Jeffrey Isaacson, *Assistant in Surgery*
B.A. 1970, Johns Hopkins University; M.D. 1974, George Washington University

David C. Johnson, *Assistant in Surgery*
B.S. 1969, M.D. 1973, Yale University

Steele Raymond Johnson, *Assistant in Obstetrics and Gynecology*
B.A. 1966, University of Washington; M.D. 1972, George Washington University

William Jones, *Assistant in Pathology*
B.S. 1964, Wheeling College; M.D. 1968, Georgetown University

Douglas Kalesh, *Assistant in Obstetrics and Gynecology*
B.S. 1963, Yale University; M.D. 1968, State University of New York Downstate Medical Center

William Kaplan, *Assistant in Medicine*
B.A. 1969, Pennsylvania State University; M.D. 1974, Hahnemann University

Thomas Eugene Kasper, *Assistant in Urology*
B.A. 1964, Cornell University; M.D. 1969, State University of New York Downstate Medical Center

Widad N. Kassira, *Fellow in Anatomy*
M.B. 1970, University of Baghdad

Daniel Katcher, *Assistant in Medicine*
B.S. 1968, University of Pittsburgh; M.D. 1972, University of Vermont

Joseph Kaufman, *Assistant in Dermatology*
B.A. 1963, New York University; M.D. 1972, George Washington University

Mahammad Kaviani, *Assistant in Pathology*
M.D. 1970, Tehran University

James Jeremy Kennedy, *Assistant in Surgery*
B.A. 1969, Duke University; M.D. 1974, George Washington University

Joseph Francis Kestner, *Fellow in Medicine (Pulmonary Diseases)*
B.S. 1964, St. Joseph's College, Pennsylvania; M.D. 1968, Thomas Jefferson University

Chul Wha Kim, *Assistant in Anesthesiology*
M.D. 1967, Yonsei University, Korea

Richard Leland Kirby, *Assistant in Obstetrics and Gynecology*
B.A. 1968, University of Delaware; M.D. 1972, George Washington University

George Franklin Kish, *Assistant in Surgery*
B.S. 1966, M.D. 1970, Ohio State University

Robert Frederic Knauft, *Fellow in Medicine (Pulmonary Medicine)*
B.A. 1964, Harvard College; M.D. 1969, Case Western Reserve University

William A. Knaus, *Assistant in Medicine*
B.S. 1968, PMC Colleges, Pennsylvania; M.D. 1972, West Virginia University

Homer Ellsworth Knudson, *Assistant in Obstetrics and Gynecology*
B.S. 1968, Brigham Young University; M.D. 1972, George Washington University

Louis Kozloff, *Assistant in Surgery*
B.A. 1965, M.D. 1969, University of Pennsylvania

Bruce Kressel, *Assistant in Medicine*
B.A. 1969, Lafayette College; M.D. 1973, Tufts University

Kerry Lee Kuhn, *Assistant in Obstetrics and Gynecology*
B.A. 1970, M.D. 1974, George Washington University

Ronald Dale Kurstin, *Assistant in Surgery*
B.A. 1967, Tulane University of Louisiana; M.D. 1971, George Washington University

John W. Kusiak, *Teaching Fellow*

Richard Lackritz, *Assistant in Obstetrics and Gynecology*
B.A. 1967, Ohio Wesleyan University; M.D. 1972, University of Texas, San Antonio

Hewitt Robert Lang, *Assistant in Orthopaedic Surgery*
B.A. 1968, University of Rochester; M.D. 1972, State University of New York

Carole Latker, *Fellow in Anatomy*

Rekha Lawande, *Assistant in Anesthesiology*
I.S. 1963, Elphinstone College; Bombay; D.D.A. 1969, University of Bombay

Allan Lazarus, *Assistant in Obstetrics and Gynecology*
B.A. 1965, City University of New York, Brooklyn College; M.D. 1969, New York University

John Kook Lee, *Assistant in Anesthesiology*
B.S. 1954, M.D. 1958, Seoul National University

James Leffers, *Assistant in Surgery*
B.A. 1969, Vanderbilt University; M.D. 1973, University of Tennessee Medical Units

Barry Jay Levin, *Assistant in Surgery*
B.A. 1966, M.D. 1970, Emory University

Lawrence Michael Levinson, *Assistant in Ophthalmology*
B.A. 1965, Cornell University; M.D. 1969, George Washington University

Robert Howard Levitt, *Assistant in Obstetrics and Gynecology*
B.A. 1968, M.D. 1972, State University of New York

Richard Allen Lewis, *Assistant in Orthopaedic Surgery*
B.A. 1966, University of New York; M.D. 1970, George Washington University

William Edward Lightfoot II, *Assistant in Neurology*
B.A. 1963, Grinnell College; M.D. 1967, Howard University

William Conrad Lillydahl III, *Assistant in Medicine*
B.A. 1970, Princeton University; M.D. 1973, Duke University

Ace Lipson, *Assistant in Medicine*
B.A. 1969, New York University; M.D. 1973, Washington University

David Martin Liverett, *Assistant in Surgery*
B.A. 1969, New York University; M.D. 1973, George Washington University

David Bruce London, *Assistant in Medicine*
B.A. 1970, M.D. 1974, George Washington University

Luiz Heraldo Lopes, *Assistant in Pathology*
M.D. 1970, Santo Casa Medical School of Sao Paulo, Brazil

Kathryn J. Lynch, *Fellow in Anatomy*

Dorcas Joanne Lynn, *Assistant in Medicine*
B.S. 1970, Dickinson College; M.D. 1974, Boston University

Steven Daniel Macht, *Assistant in Surgery*
B.S. 1965, D.D.S. 1969, University of Maryland; M.D. 1972, George Washington University

Napolean Magpantay, Jr., *Assistant in Anesthesiology*
B.S. 1964, M.D. 1969, University of the East, Philippines

John Roger Maloney, *Assistant in Psychiatry and Behavioral Sciences*
B.A. 1968, North Carolina State University; M.D. 1972, Temple University

Eloida Manasan, *Assistant in Anesthesiology*
B.S. 1957, M.D. 1963, University of the Philippines

Kenneth Francis Mangan, *Assistant in Medicine*
B.S. 1969, University of Massachusetts—Amherst; M.D. 1973, George Washington University

Thomas Mangiaracina, *Assistant in Medicine*
B.A. 1970, New York University; M.D. 1974, George Washington University

John Frank Marra, *Assistant in Medicine*
B.A. 1970, M.D. 1974, State University of New York

Fred E. Martz, *Teaching Fellow in Pharmacology*

Charles Matuszak, *Assistant in Orthopaedic Surgery*
B.A. 1967, Dartmouth College; M.D. 1971, State University of New York Upstate Medical Center

Russell C. Maulitz, *Assistant in Medicine*
B.A. 1966, Harvard University; M.S. 1967, University of London; M.D., Ph.D. 1973, Duke University

George Issac May, *Assistant in Orthopaedic Surgery*
B.A. 1965, University of Pennsylvania; M.D. 1970, University of Health Sciences/Chicago Medical School

Frank Joseph Mayo, *Assistant in Medicine*
B.A. 1970, Denison University; M.D. 1973, Ohio State University

Steven F. Mazer, *Assistant in Surgery*
B.A. 1970, Boston University; M.D. 1974, Georgetown Medical School

Joseph Paul McCormick, *Assistant in Surgery*
B.A. 1969, Alfred University; M.D. 1974, George Washington University

Modesto Mercado, *Assistant in Anesthesiology*
M.D. 1965, University of the East, Philippines

Barbara Meyer Meyers, *Assistant in Medicine*
B.A. 1961, Bryn Mawr College; M.D. 1968, George Washington University

John Michael Mikulla, *Assistant in Medicine*
B.S. 1970, M.D. 1974, University of Pittsburgh

Nooreddin Mirmirani, *Assistant in Psychiatry*
M.D. 1970, Tehran University Medical School, India

Douglas Moir, *Assistant in Medicine (Cardiology)*
B.A. 1965, Stanford University; M.D. 1969, Washington University

Bruce Berner Moor, *Assistant in Radiology*
B.S. 1968, City University of New York, City College; M.D. 1972, State University of New York Downstate Medical Center

Maunt Myint, *Assistant in Anesthesiology*
I.S. 1964, Intermediate College of Rangoon; M.B.B.S. 1970, Institute of Medicine, Rangoon

Saroya Naghshineh, *Teaching Fellow in Biochemistry*
M.S. 1972, George Washington University

Massoud Nemati, *Assistant in Medicine*
M.D. 1968, University of Tehran

Frank Gerald Nisenfeld, *Assistant in Orthopaedic Surgery*
B.S. 1966, Villanova University; M.D. 1970, Temple University

Philip David Noguchi, *Assistant in Pathology*
B.A. 1970, University of California; M.D. 1974, George Washington University

Mary J. Normandy, *Teaching Fellow in Biochemistry*
B.A. 1964, City University of New York, Hunter College

Steven Joel Nussbaum, *Assistant in Medicine*
B.S. 1970, Union College; M.D. 1974, State University of New York

Roger Oldham, *Assistant in Surgery*
B.S. 1965, Ball State University; M.D. 1969, Indiana University at Indianapolis

Corwin Anson Olds, *Assistant in Obstetrics and Gynecology*
B.S. 1947, U.S. Naval Academy; B.S. in M.E. 1955, M.S. in M.E. 1956, U.S. Naval Postgraduate School; M.D. 1972, George Washington University

Karen Frances O'Neill, *Assistant in Medicine*
B.A. 1967, Rutgers University, New Brunswick; M.D. 1971, New Jersey College of Medicine and Dentistry

Jerome Barry Orlin, *Assistant in Medicine*
B.S. 1970, University of Pennsylvania; M.D. 1974, Yale University

Ronald Sandor Oser, *Assistant in Ophthalmology*
B.A. 1967, M.D. 1970, Johns Hopkins University

Lawrence A. Oufiero, *Assistant in Medicine*
B.A. 1970, Seton Hall University; M.D. 1974, State University of New York

Gary Kazimieras Palys, *Assistant in Psychiatry and Behavioral Sciences*
B.S. 1969, St. John's University; M.D. 1973, State University of New York

Steven William Papish, *Assistant in Medicine*
B.A. 1970, M.D. 1974, University of Pennsylvania

Furnifold M.S. Patterson, Jr., *Assistant in Medicine (Hematology)*
B.A. 1967, University of North Carolina; M.D. 1971, University of Pennsylvania

Malcolm David Paul, *Assistant in Surgery (Plastic)*
B.S. 1965, M.D. 1969, University of Maryland

William Charles Payes, *Assistant in Anesthesiology*
B.S. 1970, Syracuse University; M.D. 1974, George Washington University

Stephen Michael Peters, *Fellow in Microbiology*
B.A. 1965, California State College, Los Angeles; M.Sc. 1973, Georgetown University

Barbara Peterson, *Teaching Fellow*
B.S. 1970, New Mexico State University; M.P.H. 1972, University of California, Los Angeles

Frank Ogden Petkovich, *Assistant in Anesthesiology*
B.A. 1969, University of Missouri; M.D. 1973, St. Louis University

Stephen Donohoe Pett, *Assistant in Surgery*
B.S. 1967, Seton Hall University; M.D. 1971, George Washington University

Peter Charles J. Pislor, *Assistant in Obstetrics and Gynecology*
B.S. 1970, Villanova University; M.D. 1974, New Jersey Medical School

Vincent Policelli, *Assistant in Obstetrics and Gynecology*
B.S. 1968, Fordham University; M.D. 1972, Georgetown University

Robert Post, *Assistant in Psychiatry and Behavioral Sciences*
B.A. 1964, Yale University; M.D. 1968, University of Pennsylvania

John Elliot Pressler, *Assistant in Surgery*
B.S. 1969, University of Michigan; M.D. 1973, Ohio State University

Susan Robertson Prince, *Assistant in Anesthesiology*
B.A. 1967, University of North Carolina; M.D. 1971, Duke University

Russell Quirk, *Assistant in Medicine*
B.S. 1968, Marquette University; M.D. 1972, Medical College of Wisconsin

Khosrow Rastgar, *Assistant in Pathology*
B.S. 1964, M.D. 1958, Pahlevi University, Iran

Ali Ravani, *Assistant in Pathology*
M.D. 1964, Faculty of Medicine, Tehran, Iran

Richard Brian Reff, *Assistant in Orthopaedic Surgery*
B.A. 1969, M.D. 1972, George Washington University

Marcia Ann Rhodes, *Assistant in Medicine*
B.A. 1967, Mount Holyoke; M.D. 1972, Duke University

George Riley, *Assistant in Psychiatry and Behavioral Sciences*
B.A. 1967, University of Texas at Austin; M.D. 1971, Wake Forest University

Eduardo Alfredo Rivas, *Assistant in Anesthesiology*
M.D. 1968, University Mayor of San Simon, Bolivia

Jean-Francois Roberge, *Fellow in Ophthalmology*
M.D. 1971, Laval University, Quebec

Prashant Kumar Rohatgi, *Fellow in Medicine (Pulmonary Diseases)*
M.B.B.S. 1969, All India Institute of Medical Sciences

Barry M. Rosen, *Assistant in Medicine*
B.A. 1969, Colgate University; M.D. 1973, Chicago Medical School

Thomas Lane Rothstein, *Assistant in Medicine*
B.A. 1967, George Washington University; M.D. 1974, Duke University

Bruce Rubin, *Assistant in Radiology*
B.S. 1964, City University of New York, City College; M.D. 1968, Columbia University

Joanne B. Ruby, *Assistant in Anesthesiology*
B.S. 1967, M.D. 1974, George Washington University

Frank M. Ryan, *Assistant in Medicine*
B.S. 1970, St. Joseph's College; M.D. 1974, Pennsylvania State University

Robert H. Ryan, *Assistant in Medicine*
B.S. 1968, University of Notre Dame; M.D. 1972, University of Vermont

Iradj Sadeghian, *Assistant in Medicine (Cardiology)*
M.D. 1958, University of Tehran, Iran

Alan Sager, *Assistant in Psychiatry and Behavioral Sciences*
B.A. 1967, Rutgers University, New Brunswick; M.D. 1969, Boston University

Jose Salazar, *Assistant in Medicine*
M.D. 1973, University of Zaragosa, Spain

Allen J. Saleri, *Assistant in Psychiatry and Behavioral Sciences*
F.U.B. 1965, M.D. 1971, University of Istanbul

Michael Sandberg, *Assistant in Medicine*
B.A. 1969, Boston University; M.D. 1973, Medical College of Wisconsin

Allen H. Sandler, *Fellow in Psychiatry and Behavioral Sciences*
B.A. 1966, Yale University; M.D. 1970, New York University

Philip Jay Santora, *Assistant in Psychiatry and Behavioral Sciences*
B.S. 1966, LeMoyne College; M.D. 1970, St. Louis University

Craig John Schaefer, *Assistant in Surgery*
B.A. 1970, Rutgers University, New Brunswick; M.D. 1974, Albany Medical College

Thomas Schmitt, *Assistant in Obstetrics and Gynecology*
B.S. 1968, University of Dayton; M.D. 1972, Ohio State University

David Schoening, *Assistant in Medicine*
B.A. 1968, Pacific Lutheran University; M.D. 1972, University of Oregon

Frederic Tovi Schwartz, *Assistant in Neurological Surgery*
B.A. 1965, American International College; M.D. 1969, George Washington University

Michael Carl Schweitz, *Assistant in Medicine*
B.A. 1968, M.D. 1972, George Washington University

Ronald Joseph Scott, *Assistant in Medicine*
B.S. 1969, University of Notre Dame; M.D. 1973, Boston University

Samuel Jack Scott, Jr., *Assistant in Medicine*
B.S. 1966, M.D. 1970, George Washington University

Jere Palmer Segrest, *Assistant in Pathology*
B.A. 1962, M.D. 1967, Vanderbilt University

Chic J. Shin, *Fellow in Anatomy*
B.S. 1970, M.S. 1973, Howard University

Ali Shirkhoda, *Assistant in Radiology*
M.D. 1970, Isfahan Medical School, Iran

Shaukat Ali Shah, *Assistant in Medicine*
F.Sc. 1958, M.B.B.S. 1963, Peshawar University; F.C.P.S. 1970, Pakistan College of Physicians and Surgeons

Lester Steven Shoap, *Assistant in Medicine*
M.D. 1970, Temple University

Michael H. Silver, *Fellow in Anatomy*
B.A. 1972, University of Connecticut

Eugene David Silverman, *Assistant in Pathology*
B.A. 1969, M.D. 1973, George Washington University

David Bart Simon, *Fellow in Medicine (Pulmonary Diseases)*
M.D. 1967, George Washington University

Thomas Gordon Sinderson, *Assistant in Medicine (Cardiology)*
B.A. 1965, Emory University; M.D. 1969, George Washington University

Sarah Singal, *Assistant in Medicine*
B.A. 1968, Wellesley College; M.D. 1972, Duke University

Richard Joseph Smith, Jr., *Assistant in Anesthesiology*
B.S. 1969, B.S.Med. 1971, University of North Dakota; M.D. 1973, George Washington University

Michael Sandor Sommer, *Assistant in Urology*
B.A. 1959, M.A. 1964, M.D. 1970, George Washington University

Steven Bennett Sotman, *Assistant in Medicine*
B.S. 1970, M.D. 1973, Tulane University of Louisiana

Ira Lawrence Spar, *Assistant in Orthopaedic Surgery*
B.A. 1964, City University of New York, Queens College; M.D. 1968, George Washington University

Chariklia Spiegel, *Assistant in Medicine*
B.A. 1969, University of California, Berkeley; M.D. 1973, University of California, San Francisco

Timothy Merle Spiegel, *Assistant in Medicine*
B.A. 1969, Duke University; M.D. 1973, University of North Carolina at Chapel Hill

Roger James Starkweather, *Assistant in Orthopaedic Surgery*
B.A. 1967, Northwestern University; M.D. 1971, George Washington University

H. Eric Stern, *Assistant in Obstetrics and Gynecology*
B.A. 1965, City University of New York, Brooklyn College; M.D. 1969, George Washington University

Merril Stock, *Assistant in Medicine (Gastroenterology)*
B.S. 1967, Albright College; M.D. 1971, Thomas Jefferson University

Bernard Stopak, *Assistant in Neurological Surgery*
B.S. 1959, University of Maryland; M.D. 1970, University of Montpellier, France

Robert Strautz, *Assistant in Pathology*
B.S. 1963, American University; Ph.D. 1969, University of Maryland; M.D. 1973, Howard University

Thomas Fildane Street, *Assistant in Surgery*
B.S. 1968, John Carroll University; M.D. 1972, George Washington University

Eric Edward Sung, *Assistant in Obstetrics and Gynecology*
B.S. 1963, College of William and Mary; M.D. 1967, Medical College of Virginia of Virginia Commonwealth University

Auraya Kiriwat Suriya, *Assistant in Anesthesiology*
M.D. 1970, Mahidol University, Thailand

Ronald Charles Sweet, *Assistant in Obstetrics and Gynecology*
B.S. 1969, Wright State University; M.D. 1973, George Washington University

Yaneem Zafar Syed, *Assistant in Pathology*
B.S. 1963, M.B.B.S. 1968, College of Science, India

Edwin Chit-Sang Tan, *Assistant in Urology*
B.S. 1967, Mount Union College; M.D. 1971, George Washington University

Allan Edward Tasoff, *Assistant in Ophthalmology*
B.S. 1963, Rutgers University, New Brunswick; M.D. 1968, University of Chicago

Eva Tauber, *Assistant in Medicine (Pulmonary Diseases)*
B.A. 1967, City University of New York, Brooklyn College; M.D. 1971, George Washington University

Jonur Petursdottir Thorgeirsson, *Assistant in Pathology*
M.D. 1969, University of Iceland

Eugene Timins, *Assistant in Neurological Surgery*
B.A. 1965, Johns Hopkins University; M.D. 1969, Thomas Jefferson University

Julie Timins, *Assistant in Radiology*
B.S. 1969, Pennsylvania State University; M.D. 1971, Thomas Jefferson University

Charles Kenneth Travers, Jr., *Assistant in Obstetrics and Gynecology*
B.S. 1969, University of Maryland; M.D. 1973, George Washington University

Joseph Unis, *Assistant in Radiology*
B.S. 1966, M.D. 1970, University of Nebraska

Robert Stephen Viener, *Assistant in Orthopaedic Surgery*
B.A. 1967, University of Pennsylvania; M.D. 1971, George Washington University

Van Thanh Vu, *Teaching Fellow in Pharmacology*
B.A. 1973, Case Western Reserve University

Kenneth Ward, *Assistant in Surgery*
B.A. 1969, Northwestern University; M.D. 1973, New Jersey College of Medicine and Dentistry

Daniel Waterman, *Assistant in Medicine*
B.S. 1966, Trinity College, Connecticut; M.D. 1973, Hahnemann Medical College

John Ackroyd Webster, Jr., *Teaching Fellow in Microbiology*
B.S. 1973, William and Mary College

Robert Adams Weiss, *Assistant in Medicine*
B.A. 1970, Yale University; M.D. 1974, University of Pennsylvania

Charles White, *Assistant in Medicine (Hematology)*
B.A. 1965, Harvard University; M.D. 1969, University of Pittsburgh

Peter White Whitfield, *Assistant in Surgery*
B.A. 1969, University of Rhode Island; M.D. 1974, George Washington University

Roger Bruce Wigton, *Assistant in Medicine*
B.S. 1969, University of Notre Dame; M.D. 1973, University of Cincinnati

Morris Jack Wilkenfeld, *Assistant in Medicine*
B.A. 1969, Lafayette College; M.D. 1973, George Washington University

John Willen, *Assistant in Medicine*
B.A. 1969, Tulane University of Louisiana; M.D. 1973, Wake Forest University

Arnold Jay Willis, *Assistant in Surgery*
B.A. 1970, Franklin and Marshall College; M.D. 1974, Thomas Jefferson University

Leonard Wisneski, *Assistant in Medicine*
B.S. 1969, Drexel University; M.D. 1973, Thomas Jefferson University

Suvatchava Witoelar, *Assistant in Neurology*
B.S. 1966, M.D. 1970, Chulalongkorn University, Thailand

Melvin Wolf, *Assistant in Ophthalmology*
B.A. 1963, Temple University; M.D. 1967, Thomas Jefferson University

Nathan Woodruff, *Assistant in Pathology*
B.S. 1968, University of Maryland; M.D. 1972, Howard University

William Joseph Yarbrough, *Assistant in Urology*
B.S. 1964, University of South Carolina; M.D. 1968, Medical University of South Carolina

Paul Jerome Yarowsky, *Fellow in Physiology*
B.S. 1969, Washington University

Kae Strosnider Yingling, *Assistant in Radiology*
B.S. 1969, University of Maryland; M.D. 1973, George Washington University

Dal Yoo, *Assistant in Medicine (Hematology)*
M.D. 1967, Seoul National University

Syed A. Zafar, *Assistant in Medicine (Clinical Engineering)*
B.S. 1969, University of Maryland; M.D. 1973, George Washington University

Paul Stanley Zimmons, *Assistant in Radiology*
B.S. in Pharm. 1963, Albany College of Pharmacy; M.D. 1967, George Washington University

Alan Robert Zwerner, *Assistant in Obstetrics and Gynecology*
B.A. 1970, State University of New York; M.D. 1974, Georgetown University

MEDICAL STUDENT RECORD

M.D. Degree Candidates Registered 1974–75

FIRST YEAR

Allen, Warren M. — Calif.
B.A. 1974, Swarthmore College

Allenby, Kent S. — Va.
B.A. 1973, Dartmouth College

Bagley, Esther — D.C.
B.S. 1973, Federal City College

Barton, Bette L. — Va.
B.A. 1958, Rutgers University
Ph.D. 1963, Columbia University

Basch, Peter — Conn.
B.A. 1974, Trinity College

Beckmann, Mary L. — Pa.
B.A. 1970, University of Rochester
M.S. 1974, University of Illinois

Benesh, Bruce L. — N.Y.
B.A. 1969, Adelphi University

Brooks, Dana B. — Calif.
B.A. 1971, Stanford University

Blackman, Wayne — N.Y.
B.A. 1973, New York University

Blumenthal, Bruce A. — N.J.
B.A. 1974, Columbia University

Bober, John F. — Md.
B.A. 1974, Johns Hopkins University

Bohon, Constance J. — Mo.
B.A. 1974, Mount Holyoke College

Borodulia, Nicholas N. — Md.
B.S. 1974, George Washington University

Brennan, Bruce — N.Y.
B.A. 1974, Columbia University

Brown, Martin H. — N.Y.
B.S. 1974, George Washington University

Butler, Maurice — D.C.
B.S. 1974, Howard University

Byers, Robert H. — N.Y.
B.S. 1973, State University of New York—Stony Brook

Campbell, Alan D. — Mich.
B.A. 1974, University of Michigan

Chang, Clayton W. — Hawaii
B.A. 1974, Columbia University

Cheatham, Carolyn L. — Conn.
B.A. 1971, Howard University

Chin, John — Calif.
B.A. 1973, University of California, Berkeley

Chin, Robert — D.C.
B.S. 1974, Dickinson College

Chopivsky, Peter — Ill.
B.A. 1974, Princeton University

Cohen, John B. — Va.
B.A. 1972, University of Pennsylvania

Cotter, James C. — Calif.
B.S. 1974, University of California, Los Angeles

Daniels, Marcia — Calif.
B.S. 1973, Trinity College

Davidson, Richard S. — Utah
B.S. 1974, Weber State College

Demberg, James H. — N.Y.
B.A. 1973, New York University

Dent, Dean A. — Md.
B.A. 1974, Brown University

Doppelheur, John D. — Ga.
B.A. 1974, George Washington University

Edelglass, John W. — Conn.
B.S. 1973, M.S. 1974, Tufts University

Ein, Thomas E. — N.J.
B.S. 1972, George Washington University
M.S. 1974, Georgetown University

Engstrom, Fayette — Ohio
B.A. 1968, University of Pennsylvania

Epstein, Paul M. — N.Y.
B.S. 1973, City University of New York, Brooklyn College

Evans, Geoffrey — Va.
B.A. 1973, University of Richmond

Feldman, Dennis H. — N.J.
B.A. 1974, Colgate University

Feller, Bruce S. — N.J.
B.A. 1974, University of Rochester

Filak, Andrew T. — N.J.
B.A. 1974, St. Peter's College

Frank, Dana H. — N.Y.
B.A. 1973, Brown University

Freer, Carol — Va.
B.S. 1968, University of Delaware

Frenkel, David S. — Conn.
B.A. 1973, Washington University

Frey, Linda R. — Wis.
B.A. 1969, Smith College
M.A. 1971, University of Wisconsin

Freidman, Roger J. Md.
B.A. 1973, Washington University
Fuchs, Thomas D. Md.
B.A. 1974, Duke University
Furlow, Jerilin Md.
B.A. 1969, George Washington University
Geier, Mark R. Md.
B.S. 1970, Ph.D. 1973, George Washington University
Gianfortoni, Joseph G. Pa.
B.A. 1973, Franklin and Marshall College
Gittler, Mark Calif.
B.A. 1974, Brown University
Goade, Gracia M. D.C.
B.A. 1970, University of Pennsylvania
M.S. 1972, Johns Hopkins University
Goodman, Amy S. N.J.
B.A. 1971, New York University
Goumas, William M. Va.
B.A. 1973, Emory University
Greenstein, Masha E. Mass.
B.A. 1963, Antioch College
Ph.D. 1968, Yale University
Harper, Wayne L. N.C.
B.S. 1974, Duke University
Hoeck, Barbara E. Md.
B.S. 1974, George Washington University
Hogan, Mary P. Md.
B.A. 1974, George Washington University
Holzman, Robert S. N.Y.
B.S. 1971, City University of New York
Horn, Carole E. Fla.
B.A. 1966, Brandeis University
M.A. 1969, Columbia University
Horn, Janet Md.
B.A. 1972, Vanderbilt University
M.S. 1973, Georgetown University
Horwitz, Stuart L. N.J.
B.A. 1972, Colgate University
Jacobs, Howard S. Ohio
Attended George Washington University
Jensen, Peter S. Wash.
B.S. 1974, Brigham Young University
Kane, Elinoe Mass.
B.A. 1958, Wheaton College
Kaplan, Alan N. N.Y.
B.A. 1971, George Washington University
M.A. 1974, Tufts University
Kaplan, Fred M. N.Y.
B.A. 1974, Colgate University
Kendrick, Juliette S. Md.
B.A. 1974, Wesleyan University, Conn.
Kingsley, Elizabeth M. Md.
B.A. 1936, Goucher College
Knight, Elizabeth A. Md.
B.A. 1973, Mount Holyoke College
Koren, Jeffrey H. Pa.
B.S. 1974, George Washington University
Kovarick, Suzan Pa.
B.A. 1974, University of Vermont
Kreisler, Elliot M. Md.
B.A. 1973, Johns Hopkins University
Lanzafame, Raymond J. N.Y.
B.S. 1974, Cornell University
Lee, John S. Md.
B.S. 1967, Yale University
Ph.D. 1973, George Washington University
Levin, Susan R. Fla.
B.A. 1974, Northwestern University
Levin, Stuart A. N.Y.
B.S. 1974, Cornell University
Liang, Raymond Y. Pa.
B.A. 1972, University of Pennsylvania

Liu, Mini A. Calif.
B.A. 1971, Radcliffe College
Loggins, William F. Ohio
B.A. 1974, Miami University
Longo, Michael G. Maine
B.A. 1974, University of Maine
Lovett, Jeffrey W. La.
B.S. 1971, Louisiana State University
M.S. 1973, Texas Graduate School of Bio-Medical Sciences
MacFarland, Linda C. Conn.
B.A. 1974, Connecticut College
Makinen, Lynn J. Wash.
B.S. 1974, University of Washington
Marano, Matthew J. N.J.
B.A. 1974, Columbia University
McGowan, Judson C. Ga.
B.S. 1969, University of Rochester
Michelstein, Richard D. N.Y.
B.A. 1974, University of Rochester
Miller, Holley N.Y.
B.S. 1974, Cornell University
Moore, Robert C. N.H.
B.S. 1969, Trinity College
M.S. 1973, University of Minnesota
Morris, Howard G. Md.
B.A. 1974, Wake Forest College
Moshman, Gordon S. Colo.
B.A. 1974, University of Colorado
Mudrock, John D. N.J.
B.A. 1974, Rutgers University
Munoz, Jesse B. N.Y.
B.A. 1974, Princeton University
Murray, Kevin M. Calif.
B.A. 1974, Stanford University
Myerson, Karen B. Vt.
B.A. 1972, M.A. 1973, Washington University
Neiman, Richard A. N.J.
B.S. 1974, University of Michigan
Newman, Richard S. N.Y.
B.S. 1974, Tufts University
Orton, Kimball R. Utah
B.S. 1974, Brigham Young University
Petrone, Joseph J. N.Y.
B.A. 1971, Cornell University
Pickard, Jeffrey Mass.
B.A. 1974, Johns Hopkins University
Piperi, Vincent D. N.J.
B.A. 1973, Seton Hall University
Powell, Blake L. Md.
B.S. 1973, George Washington University
Pulde, Milo F. Mass.
B.A. 1974, Tufts University
Rea, Robert F. Md.
B.A. 1973, Vanderbilt University
Rigel, Darrell S. Calif.
B.S. 1972, M.S. 1974, Massachusetts Institute of Technology
Rintel, Theodor D. N.Y.
B.A. 1973, Antioch College
Rizzoli, Paul B. Md.
B.A. 1974, Haverford College
Robinson, Lois Mass.
B.A. 1973, Stanford University
Rogal, Gary N.J.
B.S. 1974, George Washington University
Rogers, Clare R. N.Y.
B.A. 1969, Barnard College
Saidman, Sander B. D.C.
B.A. 1974, Washington University
Santos, Robert T. Calif.
B.A. 1973, University of California, Berkeley

Sarno, Robert A. — Colo.
B.S. 1974, U.S. Air Force Academy

Savitsky, S. Mitchell — N.Y.
B.A. 1973, Cornell University

Seidel, Eric C. — Pa.
B.S. 1972, Albright College
M.S. 1973, Wayne State University

Seidman, Christine — Wis.
B.S. 1974, Radcliffe College

Sheen, Michael R. — Utah
B.S. 1974, Brigham Young University

Sherman, Orrin — N.J.
B.A. 1974, University of Vermont

Shuman, Harry I. — N.Y.
B.A. 1974, University of Rochester

Silver, Lee R. — Calif.
B.S. 1970, M.S. 1974, Rhode Island University

Simons, Steven M. — N.Y.
B.A. 1971, M.A. 1974, Wesleyan University, Conn.

Singer, Ira J. — N.J.
B.S. 1974, George Washington University

Sloan, Dean D. — Va.
B.A. 1972, Duke University

Smith, Roy A. — N.Y.
B.S. 1974, City University of New York, Brooklyn College

Smith, Steven B. — Utah
B.S. 1974, University of Utah

Stevens, David M. — Md.
B.A. 1969, Washington University
M.S. 1974, George Washington University

Strauus, Steven C. — Md.
B.A. 1973, Northwestern University
M.S. 1974, George Washington University

Struck, Kent D. — N.D.
B.A. 1966, Harvard University

Sunderland, Pearson — Md.
B.A. 1974, Harvard University

Tanzer, Peter P. — Pa.
B.S. 1974, George Washington University

Tarassoff, Peter G. — Va.
B.S. 1969, Ph.D. 1974, George Washington University

Taub, Steven L. — N.Y.
B.A. 1974, City University of New York, Queens College

Taylor, George A. — Mich.
B.S. 1974, George Washington University

Tonnemacher, Kent D. — Calif.
B.A. 1972, University of California, Berkeley

Tossell, Julia W. — M.
B.A. 1969, Radcliffe College
M.A. 1970, Columbia University

Trenbath, Richard S. — D.C.
B.A. 1965, University of North Carolina—Chapel Hill

Wahl, Richard — N.Y.
B.A. 1973, University of Rochester

Waltos, David L. — Conn.
B.S. 1974, Trinity College

Weed, Thomas S. — Kan.
B.A. 1974, Williams College

Weilburg, Jeffrey B. — N.Y.
B.S. 1974, Union College

Wells, John J. — Ohio
B.S. 1974, Notre Dame University

Wemple, Donna W. — Md.
B.S. 1973, University of Maryland

Wilbur, Andrew C. — Pa.
B.A. 1974, Stanford University

Wilcox, Sandra L. — Va.
B.S. 1970, M.S. 1974, Massachusetts Institute of Technology

Winnick, Sheldon — Calif.
B.A. 1965, University of California, Berkeley

Wisoff, Jeffrey H. — N.Y.
B.S. 1974, Union College

Wong, Albert K. — N.Y.
B.A. 1974, St. John's University

Woolf, Murray A. — Calif.
B.A. 1974, University of California, Berkeley

Wurzell, William D. — Md.
B.S. 1970, Boston College
M.A. 1972, George Washington University

Wyse, Roberta L. — N.J.
B.A. 1974, Wellesley College

Ziegler, Penelope P. — Md.
B.S. 1973, George Washington University

SECOND YEAR

Allen, Donald W. — Mont.
B.A. 1972, University of Utah

Alper, Michael J. — N.D.
B.A. 1973, University of Pennsylvania

Altieri, Michael F. — Ind.
B.A. 1973, Colgate University

Anderson, Robert E. — N.J.
B.S. 1971, University of Washington

Anixter, William L. — N.Y.
B.A. 1972, University of California, Berkeley

Artiss, Frederick L. — Conn.
B.A. 1973, Johns Hopkins University

Barone, Charles J. — N.J.
Attended Wayne State University

Baxley, Robert S. — N.Y.
B.S. 1972, Gonzaga University

Bayer, Edward A. — Md.
B.S. 1969, University of Illinois at Urbana-Champaign

Beall, John A., Jr., — Calif.
B.A. 1972, St. Olaf College

Benner, Charles M. — Ohio
B.S. 1973, American University

Bennett, Howard J. — Ind.
B.S. 1972, University of Maryland

Bernstein, Robert M. — N.Y.
B.S. 1973, State University of New York at Albany

Bertolli, Susan J. — Calif.
B.A. 1970, University of California, Berkeley
M.A. 1972, Stanford University

Birnbaum, Stuart E. — Ohio
B.S. 1972, Emory University

Blatt, David E. — Ind.
B.A. 1973, Harvard University

Bliss, Mark C. — N.J.
B.S. 1973, University of Rhode Island

Blue, John F., Jr. N.C.
B.A. 1973, University of North Carolina at Chapel Hill
Blumberg, Neil H. N.J.
B.A. 1973, Emory University
Boscia, John A. Md.
B.A. 1973, Duke University
Brenner, Myron D. Pa.
B.A. 1963, Columbia University
B.Arch. 1968, University of Pennsylvania
Brickhouse, William D. Va.
B.S. 1973, Clark College
Brinton, Milton H. Calif.
Attended Brigham Young University
Brown, David L. Fla.
B.S. 1970, U.S. Military Academy
Cantamout, Steven E. Calif.
B.S. 1973, University of Santa Clara
Casas, Luis A. Spain
B.A. 1973, Johns Hopkins University
Chung, Kenton L. Calif.
B.A. 1973, University of California, Berkeley
Clark, Bernard A. Md.
B.S. 1973, Dickinson College
Clark, Gordon H., Jr. Conn.
B.A. 1970, Yale University
M.Div. 1973, Pacific School of Religion
Cohen, Marc D. Ill.
B.A. 1973, Dartmouth College
Cole, Martha T. N.J.
B.A. 1967, Vassar College
Crisp, Ronald J. Md.
B.S. 1967, Wheeling College
M.S. 1972, Georgetown University
Daniels, Toni D. N.J.
B.S. 1973, Fairleigh Dickinson University, Rutherford
Davis, Kathleen K. Md.
B.A. 1968, Wellesley College
DeOrio, James K. Mich.
B.S. 1970, U.S. Air Force Academy
Dodge, John H. Md.
B.A. 1973, Harvard University
Dolgin, Frederick C. Mass.
B.A. 1973, Yale University
Drumleski, Robert P. N.J.
B.S. 1973, St. Peter's College
Dundero, Lynn R. Va.
B.A. 1972, B.A. 1973, University of California, Berkeley
Dudley, Martha D. D.C.
B.A. 1973, Brown University
Dynof, Francis R. N.J.
B.A. 1973, Rutgers University, New Brunswick
Eisenfeld, Larry S. Va.
B.S. 1972, Muhlenberg College
Engellem, Helene A. Md.
Attended University of Maryland
Fang, Peter J. Md.
Attended University of Maryland
Fingold, Gail J. N.J.
B.A. 1972, University of Pennsylvania
FitzHarris, Joseph B. N.Y.
B.S. 1973, U.S. Military Academy
Friday, Shayla A. Va.
B.A. 1966, Trinity College, D.C.
Gelb, Daniel G. Md.
B.A. 1973, Dartmouth College
Gilante, Ardele M. N.Y.
B.S. 1973, Tufts University

Garfinkle, Terry J. N.Y.
B.A. 1973, University of Pennsylvania
Glaza, Eve E. Utah
B.F.A. 1970, University of Utah
Glikin, Sanford E. Va.
B.S. 1973, George Washington University
Gorham, Jay R. Wash.
B.S. 1973, Washington State University
Gorman, Joel R. D.C.
B.A. 1973, Wesleyan Universtiy
Gorovoy, Mark S. N.J.
B.A. 1973, Duke University
Greene, Robert D. N.Y.
B.A. 1972, George Washington University
Hales, Robert E. Ill.
B.S. 1970, U.S. Military Academy
Hanowell, Leland H. Calif.
B.S. 1973, University of California, Davis
Harhay, Joseph S. N.Y.
B.A. 1972, Syracuse University
Harrison, Johnny Ruth Calif.
B.S. 1973, George Washington University
Hawkins, Matthew T., Jr. Pa.
B.S. 1971, University of Pennsylvania
Hillsman, Regina O. N.Y.
B.A. 1972, Bryn Mawr College
Hochman, Bruce N. Calif.
B A. 1972, University of California, Berkeley
Holl, Thomas M. Ohio
B.S. 1973, George Washington University
Hom, Kenrick E. N.Y.
B.S. 1973, Tufts University
Hopkins, William P. Wis.
B.S. 1973, University of Minnesota
Hopper, Anne R. N.J.
B.A. 1973, University of Vermont
Horn, Martin S. N.H.
B.A. 1973, University of New Hampshire
Hoter, Lawrence S. Conn.
B.S. 1973, Trinity College, Conn.
Hughes, Dawn E. Pa.
Attended Bucknell University
Imershein, Ruth E. N.Y.
B.A. 1972, Washington University
Isaacson, Dale H. Md.
Attended Washington University
Jacobson, Jeff N.J.
B.A. 1973, University of Rochester
Kampmeier, Patricia A. Ill.
B.A. 1973, Northwestern University
Kanter, Mitchel A. Md.
B.S. 1973, Duke University
Kehne, Susan M. Md.
B.S. 1973, Mount Holyoke College
Keller, Marc S. N.Y.
B.A. 1973, Hamilton College
Knutson, Anne N.J.
B.A. 1973, University of Vermont
Kolzak, Nancy E. Va.
B.S. 1973, Smith College
Kravitz, Jack A. Fla.
Attended George Washington University
Krembs, Gerhard A., II N.Y.
B.A. 1972, Eisenhower College
Kubik, Carolyn J. Ill.
B A. 1973, University of Kansas
Kung, George Y. Wash.
B.S. in E.E., 1973, University of Washington
Kushner, Mark J. Md.
B.A. 1973, Johns Hopkins University

Lagin, Sheri J. N.Y.
B.A. 1973, George Washington University
Laigon, Eugene E., Jr. Pa.
B.S. 1973, Muhlenberg College
Lamensdorf, Michael D.C.
B.A. 1973, Oberlin College
Lederer, Helen A. N.Y.
B.S. 1972, George Washington University
Levine, Laurence E. N.Y.
B.A. 1972, New York University
Lewis, Norman N.Y.
B.A. 1973, Vassar College
Libby, Louis S. Conn.
B.S. 1972, Tufts University
Liebermann, Joan V. N.Y.
B.A. 1973, University of Wisconsin—Madison
Lustig, Ilana D. N.Y.
B.S. 1973, Fairleigh Dickinson University, Teaneck
Maunder, Richard J. Calif.
B.A. 1972, University of California, Berkeley
Metelits, Joel B. Conn.
Attended Pennsylvania State University
Model, Lawrence M. N.J.
B.A. 1973, Rutgers University, New Brunswick
Mosby, John A. N.Y.
B.A. 1973, City University of New York, Hunter College
Neill, Marguerite A. N.J.
B.A. 1973, Bryn Mawr College
Nenonen, Rita S. N.Y.
B.A. 1968, Vassar College
M.S.W. 1970, University of Pennsylvania
Nielsen, Peter C. Calif.
B.S. 1973, Brigham Young University
Orak, John K. N.J.
B.S. 1973, St. Peter's College
Orvin, Donna C. Md.
B.A. 1969, Ed.M. 1971, Duke University
Parker, Paul M. N.J.
B.S. 1973, Union College, N.Y.
Paul, Michael L. Pa.
B.A. 1973, Temple University
Pavluk, Charles H. Ohio
B.G.S. 1973, University of Kentucky
Peck, Thomas S. Ill.
B.S. 1972, Indiana University at Bloomington
Puro, David M. N.Y.
B.A. 1973, New York University
Rabkin, Anne E. Md.
B.A. 1973, Smith College
Rallis, Michael G. Va.
Attended George Washington University
Rhymers, Kurt L. Minn.
B.S. 1966, U.S. Military Academy
M.S. 1971, Stanford University
Rost, James W. D.C.
B.S. 1973, Pennsylvania State University
Rollins, Charles J. Md.
B.S. 1972, George Washington University
Rose, Howard A. Mass.
B.A. 1973, Harvard University
Rosenberg, Gary J. N.Y.
B.S. 1973, George Washington University
Rosenfield, Louis D. Conn.
Attended George Washington University
Rubinstein, Michael N. Md.
B.A. 1973, Wesleyan University
Rusin, Grant M.
B.S. 1973, Fordham University
Ruttenberg, Rhoda
B.A. 1961, Syracuse University
Saslow, Eric D.
B.A. 1973, Cornell University
Schiffner, Craig A.
B.A. 1973, Princeton University
Schliftman, Alan B.
B.A. 1973, University of Rhode Island
Schneider, Marta A.
B.A. 1973, Trinity College, D.C.
Schulman, Jeffrey M.
B.A. 1973, George Washington University
Seibert, Donald G.
B.S. 1973, Bucknell University
Shirley, Eric A.
B.A. 1973, Cornell University
Shumaker, Douglas R.
B.S. 1973, Pennsylvania State University
Siegel, Robert S.
B.A. 1973, Stanford University
Skahen, Deborah S.
B.A. 1973, Indiana University at Bloomington
Smith, Arthur R., III
B.A. 1973, Dartmouth College
Smith, Laurence R.
Attended Weber State College
Sokoloff, Daniel O.
B.A. 1972, Tulane University of Louisiana
Stansfield, Stephen J.
B.S. 1973, Washington State University
Stetz, Christian W.
B.S. 1971, Massachusetts Institute of Technology
Stine, Walter S.
B.S. 1973, U.S. Air Force Academy
Stoddard, Ronald A.
B.S. 1973, Brigham Young University
Thompson, Joanne
B.S. 1973, University of California, Los Angeles
Tway, Kenneth P.
B.S. 1973, Stanford University
Uretsky, Stephen H.
B.S. 1973, University of Maryland
Van Nice, Robert B.
B.S. 1970, Montana State University
Vickers, Curtis W.
B.A. 1973, University of Bridgeport
Vickery, Carlin B.
B.A. 1973, Kirkland College
Walker, Lillie
B.S. 1964, Howard University
M.A. 1971, Catholic University
M.S. 1974, George Washington University
Wedberg, Robin C.
B.A. 1972, Stanford University
Weesner, Kenneth M.
B.S. 1973, Northern Arizona University
Weitz, Susan R.
B.S. 1973, Cornell University
Wertheimer, Debra S.
B.A. 1973, Goucher College
Widlitz, Michael D.
B.G.S. 1973, University of Michigan
Willis, James A.
B.A. 1966, M.A. 1968, University of California, Berkeley
Winchenbach, Curtis L.
B.A. 1972, Northeastern University

Winston, Jonathan A. N.Y.
B.S. 1973, Muhlenberg College
Wright, Curtis, IV Pa.
B.S. 1971, Haverford College
Zielinski, Christopher J. N.Y.
B.S. 1973, University of Notre Dame

THIRD YEAR

Bakley, James F. Va.
B.S. 1964, Pennsylvania State University
Ph.D. 1969, Indiana University at Bloomington
Barnett, Peter R. Conn.
B.A. 1972, Wesleyan University
Belbeau, Daryl P. Ariz.
B.S. 1969, George Washington University
Bon, Norman C. Kans.
B.A. 1972, University of Kansas
Brancaccio, William R. N.Y.
B.A. 1972, Villanova University
Brauner, Robert E. Pa.
B.S. 1971, Cornell University
Braverman, Joseph S. N.Y.
B.S. 1970, City University of New York, City College
Brenner, Alan S. Wash.
B.A. 1972, University of Washington
Briggs, Richard R. Utah
B.S. 1972, University of Wyoming
Brown, Richard D. Pa.
B.A. 1970, Lehigh University
Buckner, Nancy V. N.J.
B.A. 1972, University of Pennsylvania
Burk, Robert D. Md.
Attended McGill University
Burka, Steven A. Md.
B.S. 1972, Bradley University
Calvert, James F., Jr. Mass.
B.A. 1967, Harvard University
Castle, Robert L. Va.
B.A. 1969, College of Wooster
Chan, Clara S. P. Hong Kong
B.S. 1972, Mary Manse College
Chandeysson, Paul L. Va.
B.S. in E.E., B.S. in M.E. 1958, Washington University
M.S. in M.E. 1962, Stanford University
Cooper Bruce S. N.J.
B.S. 1972, Bucknell University
Covey, Carolyn F. N.C.
B.S. 1972, Bennett College, N.C.
Cunningham, Peter L. N.Y.
B.S. 1972, Union College, N.Y.
Danziger, Richard E. Md.
B.A. 1963, Dartmouth College
M.D. 1968, University of Alberta
Dolick, Paul E. N.J.
B.A. 1971, Catholic University of America
Dorsey, Christopher Va.
B.A. 1972, Princeton University
Dyer, Kathy S. Mich.
B.S. 1970, Stetson University
M.P.H. 1972, University of Michigan
Eisman, Sanford A. Conn.
B.A. 1972, Hobart College
Engle, John E. Md.
B.S. 1972, U.S. Air Force Academy
Evans, Steven G. Wash.
B.S. 1972, University of Washington
Fertig, Martin F. Ohio
B.S. 1972, Carnegie-Mellon University
Elliott, Susan T. Md.
B.S. 1970, Bucknell University
M.S. 1972, George Washington University
Emhoff, Timothy A. Conn.
B.S. 1972, U.S. Air Force Academy
Enos, William F. Va.
B.A. 1972, Dartmouth College
Fernandez-Miranda, John A. Va.
B.S. 1968, Memphis State University
B.M.S. 1974, Dartmouth College
Finkelstein, Jerome L. N.Y.
B.A. 1972, New York University
Fisher, Daniel B. D.C.
B.A. 1965, Princeton University
Ph.D. 1969, University of Wisconsin—Madison
Fochios, Steven E. N.Y.
B.A. 1972, City University of New York, City College
Francis, Thomas E. Ala.
Attended Emory University
Friefeld, Richard S. N.Y.
B.A. 1970, Hofstra University
Galbavy, Edward J. N.Y.
B.S. 1971, Georgetown University
Gandy, Charles L., III N.M.
B.S. 1970, U.S. Military Academy
Gannon, Carmen Md.
B.S. in Nursing 1957, Loyola College
M.S. 1959, University of Maryland
Gardner, Richard L. Calif.
B.S. 1970, University of San Diego
Gold, Marjorie B. D.C.
B.A. 1969, Cornell College
Goldstein, Gary E. N.Y.
B.S. 1972, George Washington University
Goldstein, Stafford S. N.Y.
B.A. 1972, University of Pennsylvania
Gooch, Brent R. Idaho
B.S. 1972, Utah State University
Gossom, John B. Md.
B.A. 1972, Occidental College
Green, Leon M. N.D.
B.A. 1971, University of Kansas
B.Med.Sci. 1974, University of South Dakota
Greenwood, Lee H. Utah
B.A. 1972, University of Utah
Gurian, Ellen L. N.Y.
B.A. 1972, New York University
Hamilton, Kathleen M. Pa.
Attended George Washington University
Hartman, Albert R. Utah
Attended Utah State University
Healy, Michael J. Utah
B.S. 1972, Weber State College
Heller, Julianna W. D.C.
B.S. in Med.Tech. 1965, George Washington University
Hermann, Christopher P. Conn.
B.S. 1972, Villanova University
Hidalgo, Hector J. Va.
Attended George Washington University

Hillmann, Scott — N.J.
B.A. 1972, University of Delaware

Hirschberg, Joel M. — N.J.
B.A. 1972, George Washington University

Holt, Rickie B. — Utah
B.S. 1972, Utah State University

Horn Babette J. — N.Y.
B.A. 1972, Barnard College

Horwitz, Stephen J. — Md.
B.A. 1972, George Washington University

Hubenette, Antoinette T. — Calif.
B.A. 1968, University of California Berkeley
B.S. 1970, George Washington University

Huey, Richard G. — Calif.
B.S. 1971, University of California, Berkeley

Hyldahl, Douglas R. — Idaho
B.S. 1972, University of Utah

Johnson, Margery R. — Mass.
B.A. 1972, Smith College

Jones, Noble S. — D.C.
B.A. 1970, Swarthmore College

Kabnick, Lowell S. — N.Y.
B.A. 1972, George Washington University

Katske, Floyd A. — N.Y.
B.A. 1972, Rutgers University New Brunswick

Kay, Douglass A. — Md.
B.S. in M.E. 1969, Purdue University

Keahey, Thomas M. — Fla.
B.A. 1972, George Washington University

Keenan, Andrew M. — Md.
B.S. 1972, Tulane University of Louisiana

Kendall, Martha R. — Vt.
B.A. 1969, Wellesley College

Kinziger, Mark S. — Mich.
B.A. 1972, Kalamazoo College

Kiviat, Jeffrey H. — N.Y.
B.S. 1972, Cornell University

Klein, Michael I. — Md.
B.A. 1972, Washington and Jefferson College

Knutson, Eric L. — N.J.
Attended Bucknell University

Kohrn, Bruce Z. — Md.
B.A. 1972, Western Maryland College

Kope, Walter R. — Conn.
B.S. 1972, University of Hartford

Kornreich, Michael — N.Y.
B.A. 1971, George Washington University

Koroma, Banio P. — Sierra Leone
B.S. 1972, Mount Union College

Kovacs, Karen F. — Conn.
B.S. 1972, Bucknell University

Kozar, Mark D. — Calif.
B.S. 1971, M.S. 1972, University of California, Irvine

Leo, Philip A. — N.Y.
B.S. 1972, Bucknell University

Leonard, Andrea — Md.
B.S. 1970, University of Michigan

Levin, Wayne S. — Conn.
Attended Clark University

Locko, Roberta C. — N.Y.
B.A. 1972, Manhattanville College

Longmore, James L. — Md.
B.S. 1972, University of Maryland

Madden, Michael R. — N.Y.
B.A. 1971, College of the Holy Cross

Madsen, Bard R. — Calif.
B.S. 1972, Brigham Young University

Maher, Stephen C. — Wash.
B.S. 1970, University of Notre Dame — Ind.

Mason, Randall P. — Calif.
B.A. 1972, Northwestern University

McCowin, Marcia J.
B.A. 1972, University of California, Berkeley — Ariz.

McLoone, James R. — N.J.
B.A. 1972, University of Arizona

Merliss, Andrew D. — R.I.
B.A. 1972, Colgate University

Mets, Marilyn B.
B.A. 1969, Wheaton College, Mass. — Ohio
M.S. 1972, Harvard University

Morris, Ray D., II — D.C.
B.S. 1972, University of Akron

Murphy, James P., Jr. — N.Y.
B.A. 1972, Yale University

Nathanson, Barry R.
B.S. 1972, State University of New York at Albany — Pa.

Nemiro, Jay S. — D.C.
B.A. 1972, Temple University

Nevius, Patricia D. — N.Y.
B.A. 1971, Hiram College

Niechniedowicz, Lynne M. — N.J.
B.S. 1972, St. John's University, N.Y.

Oliver, Gregory C. — Utah
B.A. 1972, Colgate University

Orme, Geoffrey A. — Va.
B.A. 1972, University of Utah

Ostroff, Robert B. — Nigeria
Attended George Washington University

Oyewole, Morakinyo A. — Pa.
B.S. 1971, Federal City College

Pagnanelli, David A. — Md.
B.A. 1972, Temple University

Parkinson, Dennis K.
B.A. 1970, University of California, Berkeley — Md.

Paul, Ronald A. — Conn.
B.A. 1971, Temple University

Pearl, Russell K. — N.D.
B.A. 1972, University of Connecticut

Perkins, Edward W.
B.A. 1968, University of Rochester — Md.
M.A. 1972, B.S. in Med. 1974, University of North Dakota

Perlman, Mark L. — Calif.
B.A. 1972, Duke University

Petrovitch, Charis R. — N.Y.
B.S. 1972, Stanford University

Pollack, Louis D. — Calif.
B.S. 1971, George Washington University

Quan, Marvin M. — Md.
B.S. 1972, University of California, Davis

Quigley, James M. — N.Y.
B.A. 1971, Wesleyan University

Quinn, Michael J. — Md.
B.A. 1972, Dartmouth College

Rabkin, Lawrence E. — Md.
B.A. 1972, Yale University

Roberts, Jesse A., Jr. — Md.
B.A. 1972, Washington University

Romansky, Stephen H.
B.A. 1966, Brown University — N.Y.
M.A. in Govt. 1972, George Washington University

Rosen, Leonard A. — N.Y.
B.A. 1971, George Washington University

Roth, Henry J.
B.A. 1972, Miami University

Roth, Paul B. Va.
B.S. 1969, M.S. 1972, Fairleigh Dickinson University

Sablove, Robert S. N.Y.
B.S. 1971, University of New York at Albany

Salter, David M. Calif.
B.S. 1972, California Polytechnic State University

Schneider, Donald R. N.Y.
B.S. 1972, State University of New York at Buffalo

Schulman, Martin F. N.J.
B.A. 1964, New York University
Ph.D. 1968, Rutgers University, New Brunswick

Schuman, Paula C. N.Y.
B.A. 1972, New York University

Seal, Craig M. Utah
B.S. 1972, University of Utah

Seligson, Gene R. N.Y.
B.S. 1972, George Washington University

Shapiro, Steven L. Md.
B.S. 1972, Yale University

Sher, Robert J. Md.
B.A. 1972, Hiram College

Shupe, David D. Utah
B.A. 1972, University of Utah

Simonsen, Steven A. N.Y.
B.S. 1972, St. Lawrence University

Smalley, David E. Calif.
B.S. 1972, Brigham Young University

Smith, Richard G. Calif.
Attended Brigham Young University

Spiegel, Jane S. Fla.
B.A. 1971, Duke University

Spinella, Joseph A. Conn.
B.A. 1971, University of Pennsylvania

Strawberry, Carl W. D.C.
B.S. 1972, St. Vincent College

Talboys, Paul A. Md.
B.A. 1972, University of Texas at Austin

Vangrov, Mark S. Ohio
B.A. 1970, Miami University

Vargyas, Joyce M. N.J.
B.A. 1970, George Washington University

Weaver, Albert J. Va.
B.S. 1970, George Washington University

White, Gregory E. Mass.
B.A. 1972, St. Anselm's College

Willis, Dean N. Maine
B.A. 1972, Assumption College

Wolfsheimer, Frank B., Jr. D.C.
B.S. 1971, Purdue University

Wong, Raymond P. N.Y.
B.S. 1972, Fordham University

Woods, Anne M. Pa.
B.A. 1971, Catholic University of America

Yaffe, Bruce H. Md.
B.A. 1972, George Washington University

Zimmerman, Brian L. Md.
B.S. 1972, University of Maryland

Zolkind, Neil A. N.Y.
B.S. 1972, George Washington University

FOURTH YEAR

Aronster, Steven M. N.J.
B.A. 1968, Middlebury College

Andrews, Margaret E. Md.
B.A. 1971, Mount Holyoke College

Beach, George A. Conn.
B.S. 1971, Trinity College, Conn.

Berman, Keith G. Nev.
B.A. 1971, University of California, Santa Barbara

Bolego, John W. Pa.
B.S. 1970, U.S. Military Academy

Brenton, Charles J., Jr. N.J.
B.S. 1971, University of Maryland

Cain, Michael E. N.J.
B.A. 1971, Gettysburg College

Caldwell, John W. Calif.
B.S. in Engr.Sc. 1971, Northwestern University

Call, Richard A., II Utah
B.A. 1971, Brigham Young University

Caplin, Stuart R. N.Y.
B.S. 1971, University of Miami

Carmen, John C. Wyo.
B.S. 1970, University of Wyoming

Chun-Lee, William B. D.C.
B.S. 1971, George Washington University

Chrisner, William V. Md.
B.S. 1971, Pennsylvania State University

Clark, David E. N.J.
B.A. 1971, Dartmouth College

Clarke, Leon E. Liberia
B.A. 1971, Washington and Jefferson College

Cohen, Alan A. Md.
B.A. 1972, George Washington University

Cricco, Carl F. N.J.
B.S. 1971, Fairfield University

Cumming, John G. N.J.
B.A. 1971, Ohio Wesleyan University

Curry, Edward B. D.C.
B.S. 1963, Morehouse College

Davis, James E. N.J.
B.A. 1971, Lafayette College

Daynes, Randall P. Utah
B.A. 1971, University of Utah

DiFiore, Kent C. Nev.
B.S. 1970, George Washington University

Dimond, Marlin L. Utah
B.A. 1972, University of Utah

Donegan, Martha F. N.C.
B.A. 1971, University of North Carolina at Chapel Hill

Dorff, Robert J. Ohio
B.S. 1971, Georgetown University

Doyle, Edward J., Jr. Va.
B.S. in Engr. 1970, Duke University

Elliott, Daniel C. Calif.
B.A. 1971, Stanford University

Ellyn, Nicholas N.J.
B.S. 1971, University of Maryland

Farber, Stuart P. N.Y.
B.A. 1971, George Washington University

Filipescu, Nicolae Va.
Ph.D. 1957, University of Industrial Chemistry, Polytechnic Institute, Rumania
Ph.D. 1964, George Washington University

Fitzmaurice, Arthur G. Mass.
B.A. 1971, St. Anselm's College

Footer, Robert D. Md.
B.S. 1971, Ohio State University

Fortuna, Lawrence J. S.D.
B.S. 1969, M.S. 1971, South Dakota State University
B.S. in Med 1973, University of South Dakota

Frank, Charles G. Md.
B.S. 1970, Washington and Lee University

Freer, Everett C., Jr. Nev.
B.A. 1969, California Western University

Gale, John H. D.C.
B.A. 1970, Duke University

Gillespie, Dorothy L. N.C.
B.S. 1971, North Carolina Agricultural and Technical State University

Giuli, Michael F. Va.
B.S. 1971, University of Alabama

Gladsden, Robert E. D.C.
B.A. 1971, Franklin and Marshall College

Goldberg, Linn Ore.
B.S. 1970, University of Oregon

Goldman, William D. D.C.
B.A. 1972, George Washington University

Gordon, Harriet L. Md.
B.S. 1964, Howard University

Greenberg, Jay B. N.Y.
B.A. 1971, George Washington University

Greenfield, Robert M. Idaho
B.A. 1968, George Washington University
M.S. 1971, Georgetown University

Hall, Courtland J. Mo.
B.S. in Phar. 1966, University of Missouri—Kansas City

Hansing, Ronald L. Kans.
B.S. 1967, Southern Illinois University

Hardy, James R. Wash.
B.A. 1962, B.S. 1964, University of Washington

Hart, Michael M. Md.
B.S. 1964, Ph.D. 1970, George Washington University
M.S. 1966, University of Michigan

Hauck, Kenneth W. N.Y.
B.S. 1968, U.S. Military Academy

Heron, William H. D.C.
B.A. 1971, Johns Hopkins University

Hieb, Michael J. N.D.
Attended Creighton University

Ho, Smith Thailand
B.A. 1966, Columbia Union College
M.S. 1970, George Washington University

Hom, Frederick G. Calif.
B.A. 1971, University of California, Berkeley

Howisey, Robert L. Wash.
B.S. 1971, University of Washington

Hughes, Susan M. N.Y.
B.A. 1971, Manhattanville College

Jacobs, Marc H. Md.
B.A. 1971, Washington University

Johnson, Glenn D. Colo.
B.A. 1970, Princeton University

Jorris, Marlene L. Md.
B.A. 1962, Adelphi University
B.S. in Ch.E. 1964, M.S. in Ch.E. 1969, Massachusetts Institute of Technology

Kaiser, Cathryn I. N.J.
B.A. 1970, Elmira College

Katzen, Harvey I. Md.
B.S. 1972, Georgetown University

Kellett, Mirle A., Jr. Maine
B.A. 1969, Dartmouth College

Kessler, Fred B. N.Y.
B.S. 1971, George Washington University N.J.

Kimbleton, Dennis P.
B.A. 1971, Rutgers University, New Brunswick Utah

Kofoed, Kenneth R.
B.S. 1971, University of Utah Utah

Lancaster, Vere L.
B.S. 1971, University of Utah S.D.

Lardinois, Claude K.
B.A. 1971, B.S. in Med. 1973, University of South Dakota N.Y.

Lautin, Andrew L.
B.A. 1970, Columbia University D.C.

Learn, Martin P.
B.A. 1971, University of Miami Md.

Leichner, John P.
B.S. 1965, St. Joseph's College, Pa.
M.S. 1967, Ph.D. 1970, Catholic University of America Ohio

Lieberman, Jeffrey A.
B.A. 1970, Miami University Conn.

London, Raymond G.
B.A. 1971, Clark University N.Y.

Lough, Frederick C., Jr.
B.S. 1970, U.S. Military Academy West Cameroon

Lyonga, Doris E.
B.S. 1969, Barat College of the Sacred Heart Va.

MacDougall, Monica K.
B.A. 1970, Case Western Reserve University N.Y.

Maddi, Rosemarie
B.A. 1971, Mount Holyoke College Pa.

Maliniak, Keith K.
B.A. 1971, Franklin and Marshall College Md.

Mangasarian, Robert A.
B.A. 1971, Boston University N.Y.

Mann, Jason
B.A. 1971, University of Pennsylvania Wash.

Marble, Richard D.
B.A. 1970, Claremont Men's College Calif.

Marcus, Steven J.
B.A. 1970, University of Wisconsin—Madison Hawaii

Matsuoka, Lois Y.
B.A. 1971, Mills College Fla.

McCullars, George M.
B.S. in Agri. 1968, University of Florida
M.S. 1971, George Washington University Kans.

Mehl, Raymond E.
B.S. 1965, Ph.D. 1971, University of Kansas Pa.

Metheny, Jeffry A.
B.S. 1970, Geneva College Ohio

Miles, John P., Jr.
B.A. 1964, Brown University N.Y.

Mills, Carl
B.A. 1971, Syracuse University Texas

Mohn, Edward S., Jr.
B.A. 1968, George Washington University
M.S. 1972, Georgetown University Md.

Montgomery, Thomas R.
B.S. 1971, Bucknell University Ind.

Neuwelt, Clark M.
B.S. 1971, University of Wisconsin—Madison D.C.

Ney, Alan B.
B.S. 1971, St. Lawrence University Kans.

Ngumi, Paul G.
B.S. 1967, Central State University
M.S. 1971, University of Dayton N.Y.

Niechniedowicz, Frank E.
B.S. 1970, St. John's University, N.Y.

Norstrand, Lucille J. N.Y.
B.A. 1971, Vassar College
O'Connor, Sharon E. N.Y.
B.A. 1971, Mount Holyoke College
O'Keefe, Ruth A. Wis.
Attended Marquette University
Okehi, Chukuemeka O. Nigeria
B.A. 1971, University of Colorado
Okum, Neil H. Mich.
D.D.S. 1970, University of Detroit
Osborne, Robert W., Jr. Wash.
B.A. 1971, University of Washington
Page, Michael J. Mont.
B.A. 1971, University of Colorado
Paglen, Patrick G. N.Y.
B.S. 1971, U.S. Air Force Academy
Palmer, Richard N. N.M.
B.S. 1971, New Mexico State University
Patterson, Eugene B. Calif.
B.A. 1969, Stanford University
Petern, Jacob K. Calif.
B.A. 1971, Pacific College
Phair, Robert F. N.J.
B.S. 1967, Newark College of Engineering
J.D. 1971, Georgetown University
Piepgrass, Sterling R. Utah
B.S. 1971, University of Utah
Reed, Allan P. N.Y.
B.A. 1972, George Washington University
Rich, Deborah J. N.Y.
B.A. 1970, University of Pennsylvania
Richards, Peter C. Calif.
B.A. 1971, University of California, Los Angeles
Rosenblatt, Arnold J. Md.
B.S. 1969, George Washington University
Ross, Michael A. N.Y.
B.S. 1971, Dickinson College
Rothman, Barry S. Md.
B.A. 1971, George Washington University
Rucker, Richard D. Ariz.
B.A. 1969, M.S. 1970, University of Arizona
Safran, Julian E. Md.
B.A. 1972, George Washington University
Schaefer, Gregory N. S.D.
B.A. 1971, University of South Dakota
Schauer, Peter K. Conn.
B.S. 1971, University of Hartford
Schlameus, Jeffrey F. Mont.
B.S. 1971, University of North Dakota
Schutt, David C. N.Y.
B.S. 1971, U.S. Air Force Academy
Scott, Thomas W. Va.
B.S. 1969, George Washington University
Seevers, Henry N. N.J.
B.A. 1971, University of Pennsylvania

Seigel, Leonard J. N.J.
B.A. 1971, University of Rochester
Shibata, Carl S. Calif.
B.A. 1971, University of California, Los Angeles
Shubert, Dennis L. Maine
B.S. 1969, M.S. 1970, Tufts University
Sims, Edward G. Ill.
B.A. 1971, Northwestern University
Smith, Wallace D. Utah
B.A. 1971, Weber State College
Sorensen, James M. Calif.
B.S. 1971, University of California, Berkeley
Spier, Ronald B. N.Y.
B.A. 1970, New York University
Sveda, Sally A. Conn.
B.A. 1965, Smith College
M.S. 1968, Yale University
Swartz, Joel D. Ohio
B.S. 1971, Ohio State University
Sweet, Nancy D. N.J.
B.S. 1969, Chestnut Hill College
Tall, Roger H. Idaho
Attended Brigham Young University
Thompson, Fitzroy N. N.Y.
B.S. 1967, City University of New York, City College
Tornow, John J. S.D.
B.S. 1971, Creighton University
B.S. in Med. 1973, University of South Dakota
Trigg, Michael E. Conn.
B.A. 1971, Trinity College, Conn.
Trued, Sally D.C.
B.A. 1970, Northwestern University
Trumbull, Donald N.Y.
B.S. 1971, McGill University
Van Atta, Glenn B. Ohio
B.A. 1965, Ohio Northern University
Warden, Steven S. Md.
B.S. 1971, Muskingum College
Weiner, Jay H. Md.
B.A. 1971, George Washington University
Wiesner, Don R. Wash.
B.S. 1970, Oregon State University
Wile, Charles H. N.Y.
B.A. 1971, Duke University
Young, George N.Y.
B.S. 1971, Columbia University
Zinar, Lawrence C. Md.
B.E., B.S. 1968, State University of New York at Stony Brook

Summaries of Registration, M.D. Program

NUMBER OF REGISTRANTS

Class entering 1974	150	Class entering 1972	148
Class entering 1973	150	Class entering 1971	141

GEOGRAPHICAL DISTRIBUTION OF MEDICAL STUDENTS

Alabama	1	California	49
Arizona	3	Colorado	3

Connecticut	26
District of Columbia	30
Florida	8
Georgia	3
Hawaii	2
Idaho	4
Illinois	8
Indiana	4
Kansas	4
Louisiana	1
Maine	4
Maryland	90
Massachusetts	14
Michigan	7
Minnesota	1
Missouri	3
Montana	3
Nevada	4
New Hampshire	2
New Jersey	59
New Mexico	3
New York	115
North Carolina	
North Dakota	
Ohio	
Oregon	
Pennsylvania	
Rhode Island	
South Dakota	
Texas	
Utah	
Vermont	
Virginia	
Washington	
Wisconsin	
Wyoming	
Hong Kong	
Kenya	
Liberia	
Nigeria	
Sierra Leone	
Spain	
Thailand	

INSTITUTIONS IN WHICH MEDICAL STUDENTS EARNED DEGREES

Adelphi University	2
Akron, University of	1
Alabama, University of	1
Alberta, University of	1
American University	1
Arizona, University of	2
Assumption College	1
Barat College of the Sacred Heart	1
Barnard College	2
Bennett College, N.C.	1
Boston College	1
Boston University	2
Bradley University	1
Brandeis University	1
Bridgeport, University of	1
Brigham Young University	8
Brown University	6
Bryn Mawr College	2
Bucknell University	6
California Polytechnic State University	1
California, University of:	
Berkeley	18
Davis	2
Irvine	1
Los Angeles	4
Santa Barbara	1
California Western University	1
Carnegie-Mellon University	1
Case Western Reserve University	1
Catholic University of America	4
Central State University	1
Chestnut Hill College	
Claremont Men's College	
Clark College	
Clark University	
Colgate University	
Colorado, University of	
Columbia Union College	
Columbia University	
Connecticut College	
Connecticut, University of	
Cornell College	
Cornell University	
Creighton University	
Dartmouth College	
Dayton, University of	
Delaware, University of	
Detroit, University of	
Dickinson College	
Duke University	
Eisenhower College	
Elmira College	
Emory University	
Fairfield University	
Fairleigh Dickinson University, Rutherford	
Fairleigh Dickinson University, Teaneck	
Federal City College	
Florida, University of	
Fordham University	
Franklin and Marshall College	
Geneva College	

George Washington University	70
Georgetown University	7
Gettysburg College	1
Gonzaga University	1
Goucher College	2
Hamilton College	1
Hartford, University of	2
Harvard University	7
Haverford College	2
Hiram College	2
Hobart College	1
Hofstra University	1
Holy Cross, College of the	1
Howard University	5
Illinois, University of, at Urbana-Champaign	2
Indiana University at Bloomington	3
Johns Hopkins University	8
Kalamazoo College	1
Kansas, University of	4
Kentucky, University of	1
Kirkland College	1
Lafayette College	1
Lewis and Clark College	1
London, University of	1
Louisiana State University	1
Loyola College	1
Maine, University of	1
Manhattanville College	2
Marshall University	1
Mary Manse College	1
Maryland, University of	7
Massachusetts Institute of Technology	4
McGill University	1
Memphis State University	1
Miami University	4
Miami, University of	2
Michigan, University of	4
Middlebury College	1
Mills College	1
Minnesota, University of	2
Missouri, University of—Kansas City	1
Montana State University	1
Morehouse College	1
Mount Holyoke College	6
Mount Union College	1
Muhlenberg College	3
Muskingum College	1
Newark College of Engineering	1
New Hampshire, University of	1
New Mexico State University	1
New York, City University of:	
Brooklyn College	2
City College	4
Hunter College	1
Queens College	1
New York, State University of:	
at Albany	3
at Buffalo	1
at Stony Brook	2
New York University	10
North Carolina Agricultural and Technical State University	1
North Carolina, University of, at Chapel Hill	3
North Dakota, University of	2
Northeastern University	1
Northern Arizona University	1
Northwestern University	7
Notre Dame, University of	1
Oberlin College	1
Occidental College	1
Ohio Northern University	1
Ohio State University	2
Ohio Wesleyan University	1
Oregon State University	1
Oregon, University of	1
Pacific College	1
Pacific School of Religion	1
Pennsylvania State University	4
Pennsylvania, University of	16
Polytechnic Institute, University of Industrial Chemistry, Rumania	1
Princeton University	6
Purdue University	3
Radcliffe College	3
Rhode Island, University of	3
Richmond, University of	1
Rochester, University of	9
Rutgers, University, New Brunswick	5
St. Anselm's College	2
St. John's University, N.Y.	1
St. Joseph's College, Pa.	1
St. Lawrence University	2
St. Olaf College	1
St. Peter's College	3
St. Vincent College	1
Santa Clara, University of	1
Smith College	5
South Dakota State University	1
South Dakota, University of	4
Southern Illinois University	1
Stanford University	13
Stetson University	1
Stonehill College	1
Swarthmore College	2
Syracuse University	3
Temple University	4

Texas, University of, at Austin	1	Washington and Jefferson College	2
Trinity College, Calif.	1	Washington State University	2
Trinity College, Conn.	6	Washington University	5
Trinity College, D.C.	2	Washington, University of	10
Tufts University	8	Weber State College	3
Tulane University of Louisiana	2	Wellesley College	1
Union College, N.Y.	4	Wesleyan University	6
U.S. Air Force Academy	7	Western Maryland College	1
U.S. Military Academy	8	Wheaton College, Mass.	2
Utah State University	2	Wheeling College	1
Utah, University of	13	Wisconsin, University of—Madison	5
Vassar College	4	Wooster, College of	1
Vermont, University of	3	Wyoming, University of	2
Villanova University	2	Yale University	8
Number of college graduates	573	Number of institutions represented	190

Recipients of the Degree of Doctor of Medicine, 1974

Name, State of Residence, Degree Held	Internship and Residency Appointments*
Eliot R. Abrahms, Connecticut B.A. 1966, University of Pennsylvania	†Hartford Hospital, Hartford, Connecticut
Richard S. Altman, Jr., Pennsylvania B.A. 1970, Franklin and Marshall College	George Washington University Hospital, Washington, D.C.
Roger Amick, West Virginia B.B.A. 1970, Marshall University	†George Washington University Hospital, Washington, D.C.
John R. Bacon, Maryland B.S. 1970, George Washington University	†University of Michigan Affiliated Hospitals, Ann Arbor, Michigan
John T. Ball, California B.A. 1970, University of Virginia	Presbyterian-University Hospital, Pittsburgh, Pennsylvania
Ellen J. Balsley, Virginia B.A. 1967, Indiana University at Bloomington	Washington Hospital Center, Washington, D.C.
Susan H. Bane, Maryland B.A. 1968, George Washington University	George Washington University Hospital, Washington, D.C.
Paul F. Barratt, New Jersey B.A. 1969, New York University M.M.S. 1972, Rutgers University, New Brunswick	Miriam Hospital, Providence, Rhode Island
John S. Barton, Washington B.A. 1969, Lewis and Clark College B.S. in Med. 1972, University of South Dakota	†University of Maryland Hospital, Baltimore, Maryland
Walter B. Basen, Maryland B.S. 1970, University of Maryland	Johns Hopkins Hospital, Baltimore, Maryland
John K. Baska, California B.A. 1970, George Washington University	Presbyterian-University Hospital, Pittsburgh, Pennsylvania
Gregory S. Berlin, Washington B.A. 1970, University of Washington	
Paul M. Billing, California B.A. 1970, Whitman College	†University Hospital of San Diego County, San Diego, California

* Appointments listed here are Internships, except those preceded by a dagger (†), which are Residencies.

Name, State of Residence, Degree Held	Internship and Residency Appointments*
Andrew M. Blumberg, New Jersey B.S. 1970, University of Wisconsin	†Children's Hospital of Los Angeles, Los Angeles, California
James C. Boyd, Maryland Attended University of Maryland	University of Maryland Hospital, Baltimore, Maryland
Scott E. Burgess, New York B.A. 1970, George Washington University	†University Hospital, Columbus, Ohio
Bruce D. Burtoff, Washington, D.C. B.A. 1970, University of Pennsylvania	Los Angeles County-U.S.C. Medical Center, Los Angeles, California
Michael E. Callahan, Utah B.S. 1970, Brigham Young University	Fitzsimmons Army Medical Center, Denver, Colorado
Gregory V. Camp, Oregon B.S. 1968, University of Oregon	University of Michigan Affiliated Hospitals, Ann Arbor, Michigan
Thomas H. Clark, Virginia B.S. 1970, George Washington University	†University Hospital, Columbus, Ohio
Howard C. Cohn, Pennsylvania B.S. 1968, University of Pittsburgh	
Douglas H. Cornelius, Colorado Attended University of Colorado	†Children's Hospital of Los Angeles, Los Angeles, California
George F. Cresswell, Maryland Attended Washington and Lee University	†George Washington University Hospital, Washington, D.C.
Nancy K. Crotty, Indiana B.S. 1968, University of Maryland	†University of Maryland Hospital, Baltimore, Maryland
Alec Danylevich, New York B.A. 1969, Harvard University B.Med.S. 1972, Dartmouth College	†The New York Hospital, New York, New York
George M. Donahue, Connecticut B.S. 1964, Fairfield University	St. Francis Hospital, Hartford, Connecticut
Joseph W. Donovan, New York B.A. 1969, Manhattan College	†Milton S. Hershey Medical Center, Hershey, Pennsylvania
Terence P. Downing, Washington B.A. 1970, University of Washington	University of Utah Affiliated Hospitals, Salt Lake City, Utah
Martin E. Eisner, New York B.A. 1970, University of Wisconsin	
Niels C. Engleberg, Maryland B.S. 1970, George Washington University	George Washington University Hospital, Washington, D.C.
Walter S. Falkowski, New Jersey B.S. 1967, St. Peter's College M.A. 1969, Princeton University	L.A. County-Harbor General Hospital, Torrance, California
Gregory B. Faul, North Dakota B.S. in Med. 1972, University of North Dakota	
Edwin E. Ferguson, Jr., Maryland B.S. 1966, University of Rochester	University Hospitals, Madison, Wisconsin
Terrance G. Furlow, Maryland Attended George Washington University	Vanderbilt University Affiliated Hospitals, Nashville, Tennessee
Melinda M. Gardner, Washington, D.C. B.A. 1965, Duke University	George Washington University Hospital, Washington, D.C.
Robert C. Gloster, Massachusetts B.S. 1970, Georgetown University	University of Washington Affiliated Hospitals, Seattle, Washington
Rita S. Gluck, Virginia B.A. 1968, New York University	†Children's Hospital of D.C. Washington, D.C.
Robert S. Goldblatt, New York B.A. 1970, George Washington University	William Shands Teaching Hospitals and Clinics, University of Florida, Gainesville, Florida

* Appointments listed here are Internships, except those preceded by a dagger (†), which are Residencies.

Name, State of Residence, Degree Held	Internship and Residency Appointments*
Steven L. Goldman, Massachusetts B.S. 1970, George Washington University	†Children's Hospital of D.C., Washington, D.C.
Michael E. Gorin, Washington, D.C. B.A. 1970, Northwestern University	Washington Hospital Center, Washington, D.C.
Michael A. Greene, Washington, D.C. B.S. in E.E. 1964, State University of New York at Buffalo	Washington Hospital Center, Washington, D.C.
Paul S. Greenfield, New Jersey B.A. 1970, University of Pennsylvania	St. Vincent's Hospital and Medical Center of New York City, New York, New York
Joyce E. Hair, Pennsylvania B.A. 1970, Hood College	George Washington University Hospital, Washington, D.C.
Frank A. Hall, Alabama B.A. 1970, Emory University	†Medical Center Hospitals of South Carolina, Charleston, South Carolina
William R. Hardy, California B.A. 1970, University of California, Riverside	†University Hospital of San Diego County, San Diego, California
Leo M. Hartz, Pennsylvania B.A. 1969, Pennsylvania State University	†Williamsport Hospital, Williamsport, Pennsylvania
Gary L. Henricksen, Washington B.S. in Phar. 1970, University of Washington	Providence Hospital, Seattle, Washington
Howard C. Heron, II B.A. 1970, George Washington University	Mary Hitchcock Memorial Hospital, Hanover, New Hampshire
Florie Hirsch, New York B.A. 1970, Barnard College	†George Washington University Hospital, Washington, D.C.
Charles L. Hobbs III, Delaware B.A. 1969, Yale University	Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania
Douglas R. Howard, Massachusetts B.S. 1970, Brown University	New England Medical Center Hospitals, Boston, Massachusetts
Michael S. Hurley, Virginia B.S. 1962, College of the Holy Cross D.D.S. 1966, Georgetown University	
Harvey P. Insler, Florida B.S. 1969, Rensselaer Polytechnic Institute	†Hartford Hospital, Hartford, Connecticut
Paul J. Isaacson, Maryland B.A. 1970, Johns Hopkins University	†George Washington University Hospital, Washington, D.C.
Roger C. Jenkins, Jr., California B.S. 1970, University of Washington	†Riverside General Hospital, Riverside, California
Uduma Kalu, Nigeria B.S. 1967, Iowa State University of Science and Technology M.S. 1969, Howard University	Ottawa General Hospital, Ottawa, Ontario, Canada
Jack O. Kaplan, New York B.S. 1970, George Washington University	†University of Florida Affiliated Hospitals, Gainesville, Florida
Frederic H. Kass III, New Jersey B.A. 1970, Colgate University	University of Virginia Hospital, Charlottesville, Virginia
Gregory B. Kelly, Connecticut B.S. 1970, University of Maryland	Baltimore City Hospitals, Baltimore, Maryland
James J. Kennedy, Maryland B.A. 1969, Duke University	†George Washington University Hospital, Washington, D.C.
Vicky E. Kerr, South Carolina B.A. 1970, Boston University	†Montefiore Hospital and Medical Center, Bronx, New York
David J. Kestenbaum, New York B.A. 1970, Hofstra University	Beth Israel Medical Center, New York, New York

* Appointments listed here are Internships, except those preceded by a dagger (†), which are Residencies.

Name, State of Residence, Degree Held	Internship and Residency Appointments*
Robert W. Krakovitz, Pennsylvania B.A. 1969, Pennsylvania State University	†University of Miami Affiliated Hospitals, Miami, Florida
Leslie M. Kutcher, New York B.S. 1970, City University of New York, Brooklyn College	Presbyterian Hospital, New York, New York
Steven R. Laney, Washington B.S. 1970, University of Washington	†University of Miami Affiliated Hospitals, Miami, Florida
Mark M. Lau, California B.A. 1970, University of California, Berkeley	Naval Hospital, Oakland, California
Albert G. Little, Maryland B.S. 1967, D.D.S. 1971, University of Maryland	†George Washington University Hospital, Washington, D.C.
David B. London, Nevada B.A. 1970, George Washington University	George Washington University Hospital, Washington, D.C.
Paul C. Ludlow, California B.S. 1970, Brigham Young University	Parkland Memorial Hospital, Dallas, Texas
Frank D. Manart, California B.A. 1969, University of Southern California	†University of Colorado Affiliated Hospitals, Denver, Colorado
Thomas A. Mangiaracina, New York B.A. 1970, New York University	George Washington University Hospital, Washington, D.C.
William A. Marks, New York B.A. 1969, St. Lawrence University	†St. Joseph's Hospital Health Center, Syracuse, New York
Joseph P. McCormick, New York B.A. 1969, Alfred University	†George Washington University Hospital, Washington, D.C.
Robert C. McIntyre, Washington B.S. 1969, Washington State University	†University of Utah Affiliated Hospitals, Salt Lake City, Utah
Robert E. Miller, New York B.A. 1970, Hofstra University	†Milton S. Hershey Medical Center, Hershey, Pennsylvania
Ives P. Murray, New York B.A. 1969, University of Colorado	St. Joseph's Hospital, Denver, Colorado
George Q. Nealen, California B.A. 1967, Stanford University	Los Angeles County-U.S.C. Medical Center, Los Angeles, California
Robert E. Newman, Maryland B.A. 1970, Lafayette College	†University of Florida Affiliated Hospitals, Gainesville, Florida
Philip D. Noguchi, California B.A. 1970, University of California, Berkeley	†George Washington University Hospital, Washington, D.C.
Samuel W. Pagano, New Jersey B.A. 1970, Johns Hopkins University	†University Hospitals, Madison, Wisconsin
Ronald L. Paseri, New Jersey B.A. 1970, Rutgers University, New Brunswick	Framingham Union Hospital, Framingham, Massachusetts
William C. Payes, New York B.S. 1970, Syracuse University	George Washington University Hospital, Washington, D.C.
Robert W. Poole, Maryland B.S. 1970, Dickinson College	†Norfolk General Hospital, Norfolk, Virginia
Kathy L. Principi, Ohio B.A. 1970, Rutgers University, New Brunswick	†Rhode Island Hospital, Providence, Rhode Island
Asher D. Rabinowitz, Washington, D.C. B.A. 1970, Yeshiva University	Maimonides Medical Center, Brooklyn, New York
Peter A. Radice, Maryland B.A. 1970, Yale University	Strong Memorial Hospital of the University of Rochester, Rochester, New York

* Appointments listed here are Internships, except those preceded by a dagger (†), which are Residencies.

Name, State of Residence, Degree Held	Internship and Residency Appointments*
Ronald A. Remick, Ohio B.A. 1970, Johns Hopkins University	Vancouver General Hospital, Vancouver, B.C., Canada
Bruce W. Richardson, Washington B.A. 1969, University of Washington B.S. in Med. 1972, University of South Dakota	†Creighton University-Dr. Joseph's Hospital, Omaha, Nebraska
Gary S. Ross, New York B.A. 1970, Colgate University	French Hospital, San Francisco, California
Jo-Anne B. Ruby, Washington, D.C. B.S. 1967, M.S. 1970, George Washington University	George Washington University Hospital, Washington, D.C.
Maury E. Sacks, New York B.A. 1970, Lehigh University	Los Angeles County-U.S.C. Medical Center, Los Angeles, California
Peter M. Sarafan, New York B.A. 1970, Amherst College	Boston City Hospital, Boston, Massachusetts
Gregory B. Sarsfield, Maryland B.S. 1968, George Washington University	Georgetown University-VA Hospital, Washington, D.C.
Robert E. Scalettar, New York B.A. 1969, University of Wisconsin—Madison	†University of Maryland Hospital, Baltimore, Maryland
Robert L. Sexton, Washington B.S. in Basic Medical Science 1970, Gonzaga University	Methodist Hospital of Dallas, Dallas, Texas
John S. Silva, Rhode Island B.S. 1968, Providence College	USAF Medical Center, Kessler Air Force Base, Biloxi, Mississippi
Alan W. Smith, Maryland B.S. 1970, Carson-Newman College	†Children's Hospital of D.C., Washington, D.C.
Kenneth R. Smith, Florida Attended Florida Atlantic University	Naval Hospital, Portsmouth, Virginia
Peter R. Starke, New York B.A. 1970, Trinity College, Connecticut	†Children's Hospital of D.C., Washington, D.C.
Jon K. Sternburg, Maryland B.A. 1970, Bowdoin College	†University Hospitals, Madison, Wisconsin
Kathleen Stevens, Colorado B.A. 1970, University of Colorado B.S. in Med. 1972, University of South Dakota	†University of Colorado Affiliated Hospitals, Denver, Colorado
Paul R. Taylor, Utah B.A. 1970, Weber State College	Madigan Army Medical Center, Tacoma, Washington
Katherine L. Thomas, Arkansas Attended University of Arkansas	†George Washington University Hospital, Washington, D.C.
John M. Thompson, Tennessee B.S. 1970, Florida Southern University	Medical University of South Carolina, Charleston, South Carolina
John W. Thomson, Utah B.S. 1970, Brigham Young University	Latter Day Saints Hospital, Salt Lake City, Utah
Andrew L. Tievsky, Maryland B.A. 1970, University of Rochester	University of Missouri Medical Center, Columbia, Missouri
James M. Trenbeath, North Dakota B.A. 1970, Macalester B.S. in Med. 1972, University of North Dakota	University of Missouri Medical Center, Columbia, Missouri
Thomas H. Valk, Delaware B.S. 1969, Harvey Mudd College	Mayo Graduate School of Medicine, Rochester, Minnesota
John D. Van Brakle, Pennsylvania B.S. 1970, Muhlenberg College	†Children's Hospital of D.C., Washington, D.C.

* Appointments listed here are Internships, except those preceded by a dagger (†), which are Residencies.

Name, State of Residence, Degree Held	Internship and Residency Appointments*
Lewis A. Van Oadel III, Maryland B.A. 1968, University of Washington	Tripler General Hospital, Honolulu, Hawaii
Mary A. Vorachek, Michigan B.A. 1962, University of Michigan	University of Illinois Affiliated Hospitals, Chicago, Illinois
Peter W. Whitfield, Rhode Island B.A. 1969, University of Rhode Island	†George Washington University Hospital, Washington, D.C.
Philip Wisotsky, Maryland B.A. 1970, Boston University	University of Maryland Hospital, Baltimore, Maryland
Dean J. Yimoyines, Connecticut B.A. 1969, Syracuse University	Waterbury Hospital, Waterbury, Connecticut
Joseph B. Zagorski, New Jersey B.A. 1969, University of Pennsylvania	University of Miami Affiliated Hospitals, Miami, Florida

Recipients of Allied Health Degrees, 1975

ASSOCIATE IN SCIENCE

John E. Aten
Medical Services Technology
Larry E. Baker
Medical Services Technology
Morgan D. Barber
X-Ray Technology
Steven Bayes
Medical Services Technology
William Booth
Medical Laboratory Technique
Daniel B. Brandon
Medical Services Technology
Charles A. Bryant
Medical Services Technology
Larry W Camper
Nuclear Medicine Technology
Michael C. Carr
Medical Services Technology
Ronald J. Carroll
Medical Services Technology
Tyrone K. Chan
Medical Laboratory Technique
John W. Chester
Medical Services Technology
John D. Conlon
Medical Services Technology
David D. Dalko
Medical Services Technology
Jos. C. DeFrancis
Medical Services Technology
Steven W. DeSalva
Medical Laboratory Technique
James V. Dicanio
Medical Services Technology
Marilyn R. Disparti
Medical Services Technology
Richard W Dumbleton
X-Ray Technology
Robert J Engelhart
X-Ray Technology
Danny J. Fahler
Medical Services Technology
Steven A. Fisher
Medical Laboratory Technique
Marcelo A. Gayahan
X-Ray Technology
Leonard C. Gaylor
Medical Laboratory Technique
James A. Gomez
Medical Laboratory Technique
Richard A. Goodrich
Medical Services Technology
Henry O. Grady
Medical Services Technology
Paul V. Gribbons
Medical Services Technology
William E. Hammett
Medical Services Technology
Keith E. Hartjen
X-Ray Technology
David A. Holden
Medical Services Technology
Milford K. Howell
Medical Services Technology
Thomas V. Hummell
Medical Services Technology
James P. Johnson
Medical Services Technology
William C. Johnston
Medical Laboratory Technique
Danny L. Kincade
Medical Services Technology
Bradley S. Kirchner
Medical Laboratory Technique
Shep D. Kuester
Medical Services Technology
Gordon J. Lennan
Medical Laboratory Technique
James M. Liebmann
Medical Laboratory Technique

*Appointments listed here are Internships, except those preceded by a dagger (†), which are Residencies.

Tommy J. Little
Medical Services Technology
Hughie J. Lucas
Medical Services Technology
Donald H. Manley
Nuclear Medicine Technology
Robert J. Marsh, Jr.
Medical Services Technology
John D. Marshall
Medical Services Technology
Raymond L. Mayo
Medical Services Technology
Donald L. McRae
Nuclear Medicine Technology
Thomas L. Morgan
X-Ray Technology
William H. Morrison
X-Ray Technology
Martin J. Mulgrew
Medical Laboratory Technique
William A. Mullins
Medical Services Technology
Mario Narro-Garcia
Medical Services Technology
Rodolfo N. Nartea
Medical Services Technology
Conrad W. Olson
Medical Laboratory Technique
David D. Perkins
Medical Laboratory Technique
Lowell E. Phillips
Medical Services Technology
John T. Potts
Medical Services Technology
Robert W. Pryor
Medical Services Technology
Francisco Puentes
Nuclear Medicine Technology
Jesse E. Rathbun
Medical Services Technology
Joseph L. Ruliva
Medical Services Technology
Thomas R. Sansom
Medical Services Technology
Ronald L. Schmiedel
Medical Services Technology
Albert J. Smith
Medical Services Technology
Carlos W. Smith
Medical Services Technology
Walter A. Stacy
Medical Services Technology
Dennis E. Strobel
Medical Laboratory Technique
Alvin L. Surdez
Medical Services Technology
John F. Swiderski
Medical Services Technology
Michael J. Thomas
Medical Services Technology
Gregory L. Thompson
Medical Laboratory Technique
Dan T. Tilton
Medical Services Technology
Ralph Trevino
X-Ray Technology
Emilio deJ. Vazquez
Medical Laboratory Technique
Steven C. Virden
Medical Laboratory Technique
Kerry K. Walker
Medical Laboratory Technique
Ronald O. Wallace
Medical Services Technology
Delburn M. Walter
Medical Laboratory Technique
Edward W. Walters
Medical Laboratory Technique
Francis P. Ward, Jr.
Medical Services Technology
Charles E. Weister
Medical Services Technology
David M. Whipple
Medical Laboratory Technique
Ronald G. White
Medical Services Technology
Donald M. Wilkins
Medical Services Technology
William E. Wilkinson
Medical Services Technology
George D. Wilson
Medical Services Technology
John D. Wood
Medical Services Technology
Michael T. Young
Medical Laboratory Technique

BACHELOR OF SCIENCE

Raymond Thomas Arsenault
Physician's Assistant
Samuel Robles Bonilla
Physician's Assistant
John Paul Boothe
Physician's Assistant
Roger Edwin Boyd
Physician's Assistant
Richard Orion Clark
Physician's Assistant
Pedro Antonio Colon
Physician's Assistant
Philip Anthony Contino, Jr.
Physician's Assistant
Ronald Marsden Cope
Physician's Assistant
Donald Wayne Hahn
Physician's Assistant
Jack Eugene Hasty, Jr.
Physician's Assistant
Steve Jose Hernandez
Physician's Assistant
George Frederick Hillegas III
Physician's Assistant
Myrick Johnson
Physician's Assistant
Karl Radley Katterjohn
Physician's Assistant
Thomas Joseph Kennedy
Physician's Assistant
Gregory Eugene Merriweather
Physician's Assistant
Stanley Richard Rundall
Physician's Assistant
Kay Francis Schultz
Physician's Assistant
Barry Martin Serota
Physician's Assistant

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason:

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate* and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs†

* The University Senate has been renamed the Faculty Senate

† The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals

of the George Washington University as soon after order is restored as is practicably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968:*

The George Washington University is opposed to discrimination based on race, color, creed, sex, or national origin. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

---

* Amended January 18, 1973.

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.*

* The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and should be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the College

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE AND HEALTH SCIENCES, Admissions Office, School of Medicine and Health Sciences

SUMMER SESSIONS CATALOGUE, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL (Preregistration Edition, Revised Edition) AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

INDEX

A

Abbreviations, key to, 77
Academic affairs, office of, 9
Academic dishonesty, 11
Academic dismissal, 12, 36, 261–63
Academic status, 6
Accident insurance, 13
Accounting course, 68
Accreditation, 6
Administration, officers of:
  Of the University, 8
  Of the Medical Center, 9
Administrative affairs, office of, 9
Admission:
  To M.D. degree program, 26–30
  To undergraduate programs, 43–46
Advanced standing, 27, 28, 44–46
Affiliated hospitals, 18–21
Allied Health Sciences, undergraduate programs, 42–68
Alumni and allied associations, 24–25
American Civilization course, 68
American College Testing program, 43, 44
American Medical College Application Service (AMCAS), 27
Anatomy, staff and courses, 78–81
Anesthesiology, staff and courses, 81–83
Anthropology course, 68
Application:
  For admission, 26–30, 43–46
  For graduation, 36, 53, 54–55
Art courses, 68
Arts and Medicine, combined curriculum, 31
Assistants in research and instruction, 226–41
Associate in Science degree programs:
  Admission, 43–46, 56, 57, 58
  Degree requirements, 55–58
  Medical Laboratory Technique program, 56
  Medical Services Technology program, 57
  Nuclear Medicine Technology program, 57
  Radiologic Technology program, 58
  Residence requirement, 56
  Scholarship, 56
Attendance, 35, 51, 55
Auditing, 36, 50, 53

B

Bachelor of Arts and Doctor of Medicine, combined degree, 31
Bachelor of Science degree programs:
  Admission, 43–46, 62, 63–64, 65, 66
  Degree requirements, 59–67
  Residence requirements, 59, 60, 61, 62, 65
  Scholarship, 59, 62, 67
Balance sheet, 54
Biochemistry, staff and courses, 83–86
Biological Sciences courses, 69
Board of Trustees, 7–8
Buildings, 15–17
Business Administration courses, 69–70

C

Calendar, 1975–76, 4
Certificates, 42, 63, 64, 65
Changes in program of study, 53
Chemistry courses, 70
Child Health and Development, staff and courses, 86–90
Children's Hospital National Medical Center, 18
Clinic, University, 16, 17
Clinical Affairs, office of, 9
Clinical clerkships, 30
Clinical Engineering, staff and courses, 90–91
Clinical Sciences program and course, 100
Cloyd Heck Marvin Center, 6
College Entrance Examination Board test, 43

College-Level Examination program, 43, 44, 45
Colleges, schools, and divisions of the University, 6
Columbia Hospital for Women, 18
Committees, 22–23
Continuous registration, 33, 48, 54
Correspondence courses, 46
Cost of textbooks and equipment, 34
COTRANS program, 27, 28
Courses of instruction, 76–149
  Abbreviations for, key to, 77
  Numbers and symbols used in connection with, 77
  Offered in other divisions of the University, 68–75
Credit:
  Advanced standing, 27–28, 29, 44–46, 53
  For CLEP, 45
  For New York State Board of Regent's Examination, 45
  For correspondence courses, 46
  For USAFI examinations, 46
  From higher institutions, 45
  From service schools, 45
  Semester hours of, 77
  Summer school, 53–54
  Through special departmental examination, 45

D

Degrees:
  Associate in Science, 55–59
  Bachelor of Science, 59–68
  Combined Bachelor of Arts and Doctor of Medicine, 31
  Combined Master of Science and Doctor of Medicine, 31
  Doctor of Medicine, 26–41
  Dual program for Doctor of Medicine and Doctor of Philosophy, 32
Departments of instruction, 78–149
Dermatology, staff and courses, 91–92
Dishonesty, academic, 11
Dismissal from the University, 12, 36, 261–63
Distinction, degrees earned with, 31, 55
Divisions of the University, 6
Doctor of Medicine, degree program, 26–41
  Admission, 26–30
  Combined degree programs, 31–32
  Degree requirements, 31
  Fees and Financial Regulations, 33–35
  Program of study, 30
  Regulations, 35–36

E

Early decision program (AMCAS), 28
Economics course, 70
Emeriti Professors, 150–52
English courses, 70–71
Entrance requirements:
  M.D. program, 26–27
  Undergraduate, 42–47
Environmental Health program, 59–61
Equipment, student, cost of, 34
Eugene Meyer Pavilion, 16
Examinations:
  American College Testing program, 43
  CLEP, 43, 44, 45
  Medical College admission test, 29
  National Board of Medical Examiners, 27
  New York State Board of Regent's, 45–46
  Physical, 13
  Special departmental, 45
  Test of English as a Foreign Language, 46–47
  USAFI, 46
Experimental Humanities course, 71

F

Facilities, 15–21
Faculty and staff of instruction, 150–226
Fairfax Hospital, 18
Fees, 33–35, 47–50
Fellowships, 36–37

Financial aid, 36–40, 55
Financial regulations, 33–35, 49–51
Food service, 14–15
Foreign students, admission of, 46–47

G

General Alumni Association, 24
General education development test, 43
Geographical distribution of medical students, 251–52
Geography and Regional Science courses, 72
Grades, 35, 52
Graduates, 1974
  Of allied health sciences programs, 259–60
  Of M.D. program, 254–59
Graduation, 36, 54–55
  Fees, 33, 48
  With Distinction, 31, 55
Gynecology courses, 118–20

H

H.B. Burns Memorial Building, 16, 17
Health and accident insurance, 13
Health Care Administration course, 72
Health service, student, 13
Himmelfarb Health Sciences Library, 15, 16
History courses, 72
History of the School, 10
History of the University, 5–6
Holy Cross Hospital, 19
Honor societies, 41
Honorary Trustees, 8
Honors, 31
Hospital, University, 15–17
Housing, 14–15

I

Incomplete, removal of, 35, 52
Interdisciplinary courses, 100
Institutions in which medical students earned degrees, 252–54
Insurance, health and accident, 13
Internship and residency appointments, 1974 graduates, 254–59

L

Libraries, 12, 15
Loan funds, 34, 39–40, 50, 55
Location of the University, 6

M

Marvin Center, 6
Master of Science and Doctor of Medicine combined degree, 31–32
Mathematics courses, 72–73
M.D. degree candidates registered, 1974–75, 242–51
Medical admission test, 13
Medical alumni association, 24–25
Medical and Public Affairs, staff and courses, 101
Medical Center, 10
  Administration, 9
Medical ethics forum, 41
Medical Laboratory Technique program, A.S. degree, 56–57
Medical library, 12, 15
Medical school buildings, 15–17
Medical Services Technology program, A.S. degree, 57
Medical Technology program, B.S. degree, 61–62
Medicine, staff and courses, 101–112
Microbiology, staff and courses, 112–15
Military leave, 54
Munson Hall apartments, 14
Music courses, 73

N

National Board Examinations, 27
National Naval Medical Center, 19
Neurological Surgery, staff and courses, 116
Neurology, staff and courses, 117
New York State Board of Regent's Examination, 45–46
Nondegree students, 44
Nuclear Medicine Technology program, A.S. degree, 57–58
Nurse Anesthetist program, B.S. degree, 63–64
Nurse Practitioner program, B.S. degree, 64–66

O

Obstetrics and Gynecology, staff and courses, 118–20
Ophthalmology, staff and courses, 120–21
Orthopaedic Surgery, staff and courses, 121–22
Otolaryngology, staff and courses, 122–23

P

Pathology, staff and courses, 123–29
Paul Himmelfarb Health Sciences Library, 15, 16
Payment of fees, 33–34, 49–50
Pharmacology, staff and courses, 129–32
Philosophy course, 73
Physical examinations, 13
Physician's Assistant program, B.S. degree, 62–63
Physiology, staff and courses, 132–35
Political Science courses, 73–74
Prizes, 40–41
Probation, 36, 52
Program of study, M.D. degree program, 30
Programs, right to change, 12
Projected tuition increases, 34, 49
Property responsibility, 12
Psychiatry and Behavioral Sciences, staff and courses, 135–39
Psychology courses, 74

Q

Quality-point index, 52, 56, 57, 58, 59, 62, 65, 67

R

Radiologic Sciences and Administration program, B.S. degree, 66–68
Radiologic Technology program, A.S. degree, 58–59
Radiology, staff and courses, 139–46
Readmission, 46
Recipients of M.D. degrees, 1974, 254–59
Record, medical student, 242–60
Recreation, 6–7
Refunds, 50–51
Registrants, number of, M.D. program, 251
Registration, 32
  Summaries of M.D. program, 251–54
Regulations, 11–12, 35–36, 51–55, 261–63
  Financial, 33–35, 47–51
Release of student information, policy on, 11–12
Religion courses, 74
Research, assistants in, 226–41
Residence halls, 14
Residence requirements, 55, 56, 59, 60, 61, 62, 65
Right to change programs, 12
Right to change rules, 12
Right to dismiss students, 12
Ross Hall of Science Building, 15, 16

S

St. Elizabeths Hospital, 19–20, 21
Scholarship, 51–53, 55, 56, 59, 62, 67
Scholarships, 37–39
Schools of the University, 6
Selection procedures, 28–30
Semester hours of credit, explanation of, 77
Service school credit, 45
Sociology courses, 74–75
Special departmental examinations, 45
Speech and Drama courses, 75
Staff of instruction, 150–226 (*see also* appropriate department)
Statistics courses, 75
Student affairs, 12–15
Student equipment, cost of, 34
Student health service, 13
Student information, release of, 11–12
Summaries of registration, M.D. program, 251–54
Surgery, staff and courses, 146–48
Suspension, 12, 36, 52–53, 261–63

T

Test of English as a Foreign Language, 46–47
Textbooks, cost of, 34
Transcripts, 28, 44, 48, 54
Transfer within the University, 53
Trustees, Board of, 7–8
Tuition:
  Fees, 33, 34, 47–48
  Deposit, 30, 44, 48
  Projected increases, 34, 49

U

Undergraduate programs, 42–68
United States Armed Forces Institute Examinations, 46
University, academic status of, 6
University Center fee, 33, 34, 47, 49
University Clinic, 16, 17
University, history of, 5–6
University Hospital, 15–17
University, location of, 6
Urology, staff and courses, 148–49

V

Veterans Administration Hospital, 20
Veteran's Education, 15

W

Walter G. Ross Hall of Science Building, 15, 16
Warwick Memorial Building, 17
Washington Hospital Center, 20
Watson W. Wise Emergency Pavilion, 16, 17
Withdrawal, 50–51, 53

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart Sc.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.Forens.S.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers), Master of Science in Forensic Science (M.S. in Forens.S.), Master of Science in Special Studies (M.S. in Sp.Std.), and Doctor of Philosophy (Ph.D.)

SCHOOL OF MEDICINE AND HEALTH SCIENCES: Associate in Science (A.S.), Bachelor of Science (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Science in Medical Technology (B.S. in Med.Tech), and Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L. (Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Engineering Administration (M.E.A.), Master of Science (M.S.), and Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor of Science in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master of Arts in Education (M.A. in Ed.), Master of Arts in Teaching (M.A.T.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A.), Bachelor of Science in Administration (B.S. in Adm.), Bachelor of Science in Health Care Administration (B.S. in H.C.A.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.) and Master of Arts (M.A.), and Master of Science in International Affairs (M.S.I.A.)

THE GEORGE WASHINGTON UNIVERSITY

COLUMBIAN COLLEGE OF ARTS AND SCIENCES, 1821

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE AND HEALTH SCIENCES, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

THE DIVISION OF UNIVERSITY STUDENTS, 1930

THE COLLEGE OF GENERAL STUDIES, 1950

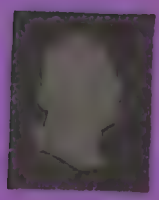
THE SUMMER SESSIONS, 1916

THE UNIVERSITY HOSPITAL, 1898

THE DIVISION OF EXPERIMENTAL PROGRAMS, 1973

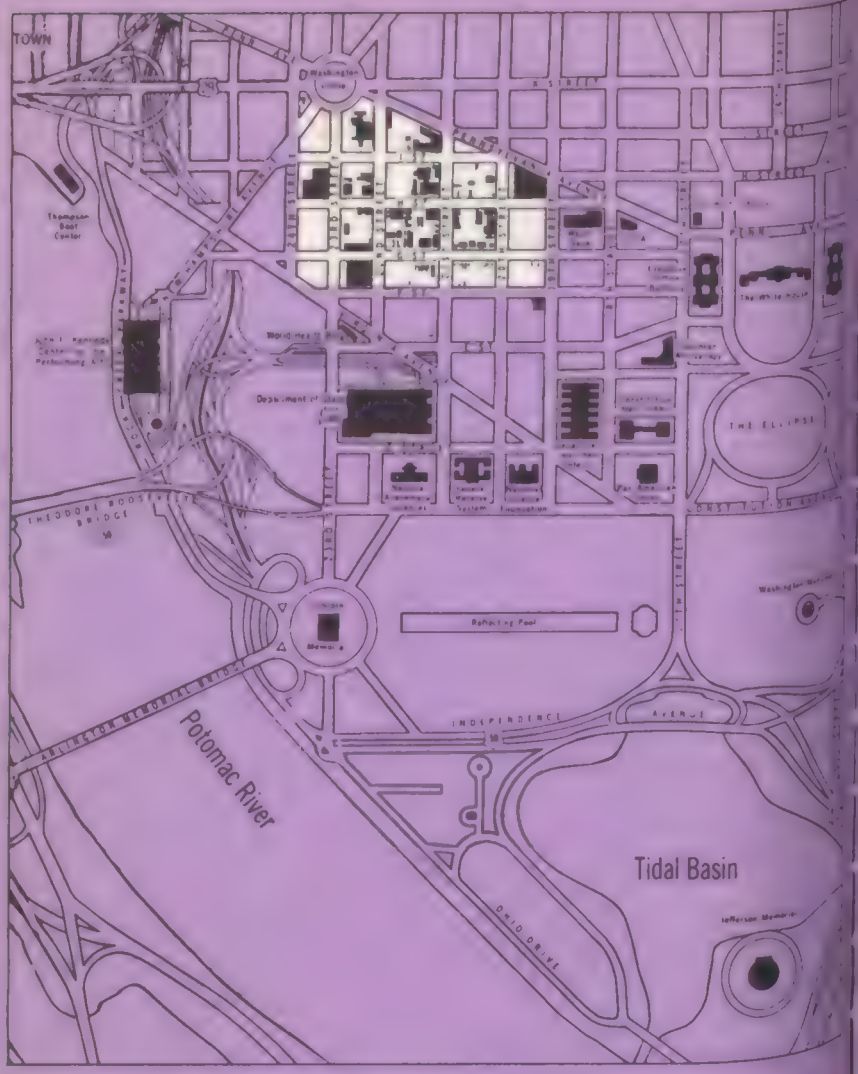
The George Washington University Bulletin

Vol. LXXIV, No. 9, July, 1975



NATIONAL
LAW
CENTER

1975-1976



/ WASHINGTON, D.C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
Volume LXXIV, Number 9, July, 1975

Published by The University at Washington, D.C. 20052

MONTHLY: DECEMBER, JUNE
(2 ISSUES IN MAY, 3 ISSUES IN MARCH, JULY)

Second Class Postage Paid at Washington, D.C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN

THE NATIONAL LAW CENTER

1975–1976

WASHINGTON, D.C. 20052



CONTENTS

Page

4 Calendar
6 The National Law Center
11 The Juris Doctor Degree Program
19 Master's and Doctoral Programs
24 Degree Programs for Foreign Students
26 Unclassified Students
27 Continuing Legal Education
29 General Information
30 Admission
32 Registration
34 Fees and Financial Regulations
38 Financial Aid
40 Prizes
42 Regulations
48 University Computer Center
49 Student Services
52 Courses of Instruction
52 Courses for Juris Doctor Candidates
62 Advanced Courses
84 Special Programs in Research and Instruction
87 The George Washington Law Association
89 The University
90 Board of Trustees
92 Officers of Administration
93 Faculty and Staff of Instruction
99 Summary of Registration, Fall Semester 1974–75
101 Appendix: Recently Established Regulations
108 Index

THE CALENDAR 1975–76*

JUNE 1975

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

JULY 1975

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

AUGUST 1975

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SEPTEMBER 1975

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

OCTOBER 1975

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

NOVEMBER 1975

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

DECEMBER 1975

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

JANUARY 1976

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

FEBRUARY 1976

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29						

MARCH 1976

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

APRIL 1976

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

MAY 1976

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

1975 SUMMER TERM

May 27	Registration for all sessions (12 noon-7 p.m.) *Tuesday*
May 28	First-session and 13-week session classes begin *Wednesday*
July 4	Holiday *Friday*
July 7	First-session classes end *Monday*
†*July 8–10*	First-session examination period *Tuesday–Thursday*
July 11	Registration for students attending second-session only (2–6 p.m.) *Friday*
	Application for September 30 graduation due as part of registration
July 14	Second-session classes begin *Monday*
August 20	Last day of classes *Wednesday*
August 21–23	Second-session and 13-week session examination period *Thursday–Saturday*

* This calendar is subject to change.

† Courses in the 13-week session will meet on their regularly scheduled days during the week of July 7.

1975–76 FALL SEMESTER

August 21–22	Registration *Thursday* (12:30–7 p.m.) and *Friday* (3–7 p.m.) Application for February graduation due as part of registration
August 25	Classes begin *Monday*
September 1	Labor Day (holiday) *Monday*
November 27	Thanksgiving recess begins after last class *Wednesday*
December 1	Classes resume *Monday*
December 3	Last day of fall-semester classes *Wednesday*
December 4–20	Examination period for all students other than those in the first-year J.D. degree program *Thursday–Saturday*
January 5, 7, 9	Examination period for students in the first-year J.D. degree program *Monday, Wednesday, Friday*

1976 SPRING SEMESTER

**January 12–13*	Registration *Monday–Tuesday* Application for May graduation due as part of registration
January 14	Classes begin *Wednesday*
February 16	Winter Convocation (holiday) *Monday*
March 1	Application for 1976–77 teaching fellowships due *Monday*
March 27	Spring recess begins after last class *Saturday*
April 5	Classes resume *Monday*
April 28	Last day of spring-semester classes *Wednesday*
April 29-May 15	Examination period *Thursday–Saturday*
May 23	Commencement *Sunday*

*...n of registration to be announced.

THE NATIONAL LAW CENTER

HISTORY

THE LAW CENTER, the oldest law school in the District of Columbia, was established in 1865 with a formal program of two years of study. This was largely through the efforts of the Reverend George Whitefield Samson, President of Columbian College, whose action resulted in the purchase of a separate building for holding law classes. The building had belonged to Trinity Church, of which Francis Scott Key had been Senior Warden. It was occupied by the Law Center until 1884.

Sixty graduates, from twenty-two of the then thirty-seven states, received degrees in 1867. The school continued to have a student body and a faculty which reflected the fact that it was at the seat of our nation's government. Associate Justices David J. Brewer and John Marshall Harlan of the Supreme Court of the United States were among the prominent members of the bench and bar who were on the faculty.

In 1877, one year after the first such program was adopted in the United States, the Law Center instituted a course leading to the degree of Master of Laws. In 1898, the course of instruction for the degree of Bachelor of Laws was extended to three years. The Law Center took part in 1900 in the organization of the Association of American Law Schools.

In the past quarter-century the Law Center expanded its course and seminar offerings with consideration of the needs of first-degree and graduate students. The degree of Doctor of Juridical Science was instituted in 1940. The need of foreign lawyers who came to this country and who required additional preparation for law work in the United States resulted in the creation of programs for the degrees of Master of Comparative Law in 1946 and Master of Comparative Law (American Practice) in 1951.

In 1954, National University School of Law, which had an important place in legal education in the District of Columbia since 1869, was absorbed by the George Washington University Law School.

Since 1954, programs of special research and study have enriched the basic curriculum. These include the Environmental Law Program; Patent Law Program; International Law Program; the Government Contracts Program; and the Law, Science, and Technology Program.

Additionally, the Law Center has been a leader in developing a curriculum to meet the legal needs of the poor and the disadvantaged. A clinical law



program has been developed which is the equal of that at any law school in the nation. Special projects include the Consumer Protection Center, the George Washington Legal Aid Bureau, and individual projects supervised by the Law Students Civil Rights Research Council.

Realizing the need for legal services for all members of society, the National Law Center, while maintaining its strong course offerings in patent law, administrative law, and corporate law, has developed a rich selection of courses in poverty law covering housing, sales, civil rights, and welfare.

Alumni of the National Law Center have included United States Senators, Congressmen, Ambassadors, and Cabinet Members. Its graduates have gone on to become members of both the federal and state judiciaries as well as noted members of the bar of every state in the union.

LOCATION IN THE NATION'S CAPITAL

Of special significance is the location of the National Law Center in the Nation's Capital, the focal point of the law in action, both American and international. The work of the Center goes on in this environment, presenting a unique opportunity for observation and study of federal agencies—judicial, legislative, and administrative. Readily accessible are the Supreme Court of the United States, the federal trial and appellate courts of the District of Columbia, and, in addition, federal courts of special jurisdiction, such as the United States Court of Claims, the United States Court of Customs and Patent Appeals, the Tax Court of the United States, and the Court of Military Appeals. Current federal legislation can be studied as it is considered by Congressional committees and as it comes up for debate on the floors of the House of Representatives and the Senate. With respect to the federal administrative agencies, students here in Washington have matchless opportunities for study and observation. They can attend informal and formal hearings of these agencies and can obtain from the docket sections complete records of administrative adjudication in specific cases. Illustrative of such federal agencies are the Interstate Commerce Commission and the Civil Aeronautics Board in the field of transportation; the Federal Trade Commission in the field of trade regulation; the Securities and Exchange Commission in the field of security issues and corporate finance; the National Labor Relations Board in the field of labor-management relations; the United States Patent Office in the field of patent law; the Federal Power Commission in the field of water, natural gas, and electric power; and the Federal Communications Commission in the field of radio and television.

Supplementing these environmental advantages of law in action are the exceptional research library collections in the Library of Congress, in the various departments of the federal government, and in the libraries of the headquarters of national and international organizations. The notable library of the Carnegie Foundation for International Peace has been acquired by George Washington University for use of research students in international and comparative law, fields with respect to which Washington has come to be called "The Capital of the World."

The years of residence at law school are years of participation in the life of the community, which in the case of the George Washington University National Law Center is the government of the United States. As a consequence, the study of law takes on added meaning, whether the goal be government

service or practice, general or specialized, and whatever the community in which the student plans to practice.

OBJECTIVES

The purpose of the National Law Center is to prepare men and women to meet the needs of society in many fields of law. As a national law school, the Center does not emphasize any particular geographic area in its instruction; therefore, it prepares students to practice law in any part of the country. The Center also offers a program of legal education for foreign students. The Law Center seeks to fulfill these objectives through (1) a rich and varied curriculum taught by eminent professors and highly qualified specialized instructors; (2) an extensive clinical law program where students learn legal skills by actual practice; (3) two law journals which specialize in public law and international law; (4) trial practice; (5) participation in the Van Vleck Appellate Case Club (a moot court competition); (6) a series of student professional co-curricular activities; (7) studies on an advanced level for foreign as well as for American students; and (8) a continuing legal education program for members of the bar.

THE NATIONAL LAW CENTER COMPLEX

The National Law Center Complex consists of three buildings: Stockton Hall, Bacon Hall, and the Jacob Burns Law Library.



STOCKTON HALL

Stockton Hall is the main classroom building. It also holds faculty offices and the offices of the Dean and the Associate Deans of the Law Center, as well as the Records Office and student lounges.

BACON HALL

Bacon Hall houses faculty offices; student lounges; the *George Washington Law Review* Office; the Institute of Law, Psychiatry, and Criminology; the Government Contracts Program; the Admissions Office; the Law Center Placement Office; the offices of the *Journal of International Law and Economics;* the Black America Law Student Association; the Law Students Civil Rights Research Council; the Van Vleck Appellate Case Club; the *Advocate,* the law school newspaper; the Student Bar Association; the Consumer Protection Center; the Legal Aid Bureau; and La Raza, the national Chicano law students association.

THE JACOB BURNS LAW LIBRARY

The Law Library of substantially over 140,000 volumes is housed in the modern Jacob Burns Law Library Building, adjoining Stockton Hall on the south side. This facility, opened for use on October 1, 1967, comprises nine floor and deck levels with about 49,000 square feet of floor space. Its shelf capacity now in place will accommodate over 170,000 volumes; with supplementary shelving in Stockton Hall and a small branch for the *Law Review* in Bacon Hall, the library provides space for almost 200,000 volumes. Seating for more than 500 readers is provided in four reading rooms, lounge and smoking areas, carrels, enclosed study cubicles, semi-private reading alcoves, and seminar rooms. Three photocopy machines are provided for reader use.

The collections comprise a comprehensive working library of Anglo-American law, with supplementary material in disciplines peripheral to law (such as business, finance, labor relations, sociology, criminology, political science, biography, foreign affairs, and others). Special areas are maintained for collections in tax law, labor law, patent-trademark-copyright law, international law, and foreign and comparative law. Included in the collections are the appellate decisions of all state courts and decisions of the federal courts, with comprehensive collections of English and Canadian court decisions; the currently annotated statutes of the 50 states; all federal statutes; English and Canadian statutes; selected statutes of other nations; and an extensive periodical collection, kept current by more than 950 subscriptions, covering virtually all American legal periodicals and most of those published in English throughout the world. The library is strong in its treatise holdings, administrative and regulatory materials, and Congressional coverage. The growing international law holdings include virtually complete collections of United Nations printed material and that of the European Economic Community, all recent material from the International Labor Organization, and current and retrospective collections of international treaties. A large portion of the holdings of the former library of the Carnegie Endowment for International Peace, acquired by the University in 1950, are in the Law Library.

ENTRANCE REQUIREMENTS

For information on "Application for Admission" to the Juris Doctor degree program, see page 31. Admission to candidacy for the degree of Juris Doctor requires a Bachelor of Arts or equivalent degree from an accredited college or university, a satisfactory quality of work, and an acceptable distribution of courses. Any substantial number of hours taken on a pass-fail or other ungraded basis may be seriously detrimental to an applicant's chances for admission. Eligibility is based on personal and scholastic records and on the result of the Law School Admission Test. No applicant will be acceptable in transfer who is ineligible to return in good standing to a previously attended law school. From the applicants, a selection is made by the Committee on Admissions.

Information concerning the Law School Admission Test may be obtained from the Dean of the National Law Center or from the Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540; or 1947 Center Street, Berkeley, Calif. 94704. The test is administered at various centers in the United States. It is anticipated that the testing dates for 1975–76 will be in October, December, February, April, and July. Completed application blanks and fees must be received by the Educational Testing Service at least two weeks before the date of the test. It is not necessary that formal application for admission be made prior to taking the test.

ADVANCED STANDING

In unusual circumstances, advanced standing toward the degree of Juris Doctor may be granted for work of high quality successfully completed in other law schools which are members of the Association of American Law Schools or are approved by the American Bar Association. Transferred credits will not be recognized in excess of those which might be earned in a similar period in the National Law Center.

Advanced standing will not be granted for law work already counted toward the Bachelor of Arts or other pre-legal degree.

TUITION DEPOSIT

Every student admitted to the National Law Center as a candidate for the degree of Juris Doctor must submit a tuition deposit ($100 initially plus $350 later) after receipt of notification of acceptance. This deposit is credited toward tuition and is refundable only in cases of applicants called into military service.

PROFILE OF THE CLASS ENTERING IN THE FALL SEMESTER 1974–75

The first-year class of approximately 400 students was selected from more than 4,000 applicants from 700 colleges and universities. Applications were received from every state in the union. Thirty-five per cent of the first-year class were women.

The following colleges and universities are each represented by three or more members of the first-year class: American University; Amherst College; Barnard College; Brandeis University; Brooklyn College; Bucknell University; Boston University; Brown University; Carnegie-Mellon University; College of William and Mary; Cornell University; Columbia University; Dartmouth College; Duke University; Emory University; Franklin and Marshall College; George Washington University; Georgetown University; Grinnell College; Harvard University; Indiana University at Bloomington; John Hopkins University; Massachusetts Institute of Technology; Michigan State University; Mount Holyoke College; Pennsylvania State University; New York University; Northwestern University; Oberlin College; Princeton University; Purdue University; Rensselaer Polytechnic Institute; Smith College; State University of New York at Buffalo; State University of New York at Binghamton; Stanford University; Syracuse University; Trinity College (Conn.); Tufts University; United States Air Force Academy; United States Military Academy; United States Naval Academy; University of California, Berkeley; University of California, Los Angeles; University of California, Riverside; University of Missouri—Columbia; University of Wisconsin—Madison; University of Chicago; University of Illinois; University of Maryland; University of Michigan; University of New Hampshire; University of Notre Dame; University of Pennsylvania; University of Rochester; University of Utah; University of Virginia; United States Coast Guard Academy; Washington University; Wellesley College; Wesleyan University; Williams College; Yale University.



THE CURRICULUM

The curriculum for the degree of Juris Doctor at the National Law Center offers the candidate one of the largest and most varied selections of courses in the country. First-year students are required to take courses in Civil Procedure; Constitutional Law; Contracts; Criminal Law and Procedure; Legal Research, Writing, and Professional Responsibility and Ethics; Property; and Torts. These courses give students the basis upon which all further legal study is built. In the second and third years of study, students must take Evidence and fulfill a two-credit legal writing requirement. Beyond these requirements the students are free to choose from the many course and project offerings. The Law Center prides itself on allowing students their freedom to design their own program of study.

The curriculum is organized so that students may begin the study of law for the Juris Doctor degree only at the start of the fall semester. Transfer students may enter at the start of the spring semester also.

DAY DIVISION

First Year

FALL SEMESTER		SPRING SEMESTER	
Contracts I	4	Contracts II	2
Torts	4	Property	4
Criminal Law and Procedure	4	Constitutional Law	4
Legal Research, Writing, and Professional Responsibility and Ethics	2	Civil Procedure	4
Total semester hours	14	Total semester hours	14

Second Year

FALL SEMESTER		SPRING SEMESTER	
Elective	14	Evidence	4
		Elective	10
Total semester hours	14	Total semester hours	14

Third Year

FALL SEMESTER		SPRING SEMESTER	
Elective	12	Elective	14
Legal writing requirement[1]	2		
Total semester hours	14	Total semester hours	14

[1] This requirement may be satisfied by service on the *Law Review*, by satisfactory completion of a seminar which requires a research paper, or by satisfactory completion of Law 344, *Legal Writing*.

EVENING DIVISION

First Year

FALL SEMESTER		SPRING SEMESTER	
Contracts I	4	Contracts II	4
Torts	4	Criminal Law and Procedure	4
Legal Research, Writing, and Professional Responsibility and Ethics	2	Civil Procedure	2
Total semester hours	10	Total semester hours	10

Second Year

FALL SEMESTER		SPRING SEMESTER	
Property	4	Constitutional Law	4
Elective	6	Elective	6
Total semester hours	10	Total semester hours	10

Third Year

FALL SEMESTER		SPRING SEMESTER	
Elective	8	Evidence	4
*Legal writing requirement	2	Elective	6
Total semester hours	10	Total semester hours	10

Fourth Year

FALL SEMESTER		SPRING SEMESTER	
Elective	10	Elective	10
Total semester hours	10	Total semester hours	10

Summer Term or Ninth Semester

Elective	4

REQUIREMENTS FOR THE DEGREE

The student must have completed a residence period of three academic years (four years for evening students) and 84 semester hours of required and elective courses, with a cumulative average of at least 65. At least one academic year of residence and 28 semester hours are required of students admitted with

* This requirement may be satisfied by service on the *Law Review*, by satisfactory completion of a seminar which requires a research paper, or by satisfactory completion of Law 344, *Legal Writing*

advanced standing. The work of the final semester or summer session must be completed while in residence at the National Law Center. Credits allowed by way of advanced standing are not included in computing the average required for graduation.

Graduation Requirements.—See page 46 for a statement of the graduation requirements.

RESIDENCE

Candidates for the Juris Doctor degree must complete a residence period of three academic years. Attendance in the day division for the fall and spring semesters constitutes residence for an academic year: similar attendance in the evening division constitutes residence for three-fourths of an academic year. Consequently, a day student must attend 6 semesters to meet residence require-



ments; an evening student must attend 8. Students authorized to take schedule of less than 10 hours in the day division or less than 6 hours in the evening division receive residence credit on a proportional basis. Students who attend the summer sessions receive fractional residence credit.

HONORS

The following regulations apply to Juris Doctor candidates graduating in May, 1976, and after. For students graduating prior to May, 1976, the former regulations apply.

The degree of Juris Doctor "With Highest Honors" is awarded to those students, not exceeding 3 per cent of the graduating class, who have obtained the highest cumulative averages of at least 85 or better.

The degree of Juris Doctor "With High Honors" is awarded to those students with the highest cumulative averages of 80 or better. The number of students receiving degrees "With High Honors," when added to the total number of students receiving degrees "With Highest Honors," may not exceed 10 per cent of the graduating class.

The degree of Juris Doctor "With Honors" is awarded to those students with the highest cumulative averages of 75 or better. The number of students receiving degrees "With Honors," when added to the total number of students receiving degrees "With High Honors," and "With Highest Honors," may not exceed 40 per cent of the graduating class.

ORDER OF THE COIF

The Order of the Coif, a national legal honor society, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University Chapter was established in 1926. Members are elected each year from the highest-ranking 10 per cent of the graduating Juris Doctor candidates.

PUBLICATIONS

The *George Washington Law Review*, published five times a year, is edited and managed by the students of the National Law Center. The *Law Review* is known for its emphasis on federal and public law; however, it is also devoted to research in other important legal areas. The staff of the *Law Review* is selected on the basis of a writing competition and on the basis of grades. The editorial board is selected from those students who have successfully completed the first year of *Review* work. Students receive 4 semester hours of academic credit for the two-year program.

The *Journal of International Law and Economics*, managed and edited by law students, is a biannual publication of the Law Center. It presents articles and commentaries on public and private international financial development, comparative law, and international law. The staff of the *Journal* is selected through a writing competition, and students earn academic credit for their work.

MOOT COURT

The Van Vleck Appellate Case Club provides realistic training in appellate oral advocacy for students in the National Law Center. Each year two competitions are held: the upperclass competition is held in the fall and the first-year competition is held in the spring.

LAW CENTER ORGANIZATIONS

BLACK AMERICA LAW STUDENT ASSOCIATION (BALSA)

The Black America Law Student Association is a national Black law students organization which has chapters at some 80 law schools. BALSA sponsors law speakers and various programs.

INTERNATIONAL LAW SOCIETY

The International Law Society is an organization of students interested in the practice of international law. The Society sponsors speakers and various programs.

LA RAZA

A national Chicano law students organization which has chapters at various law schools, La Raza sponsors law speakers and various programs.



LAW FRATERNITIES AND SORORITIES

The chapters of Beta Kappa Pi, Delta Theta Phi, Phi Alpha Delta, and Phi Delta Phi at the National Law Center sponsor speakers and various social occasions.

LAW STUDENTS CIVIL RIGHTS RESEARCH COUNCIL (LSCRRC)

The Law Students Civil Rights Research Council is a national organization of law students concerned with the legal problems of civil rights. LSCRRC offers clinical law projects for which students may receive academic credit.

PATENT LAW CLUB

The Patent Law Club, an organization of students interested in patent and related law, conducts an extensive speakers program as well as various social events.

STUDENT BAR ASSOCIATION

The Student Bar Association is the law student governing body, responsible for allocating funds among the various student organizations. It also conducts a speaker program for the law school. All members of the student body are members of the Student Bar Association.

TAX LAW ASSOCIATION

As an organization of students interested in careers in tax law, the Tax Law Association conducts various programs of interest to tax law specialists.

WOMEN'S RIGHTS COMMITTEE (WRC)

The Women's Rights Committee is an organization of all the women in the law school. It is primarily interested in the place of women in law schools and in the legal profession. WRC conducts seminars and sponsors speakers.

JOINT JURIS DOCTOR—MASTER'S DEGREE PROGRAM

In certain instances, arrangements may be made for students to work concurrently toward both the Juris Doctor degree in the National Law Center and a Master's degree in some fields in the University's Graduate School of Arts and Sciences, School of Government and Business Administration, or School of Public and International Affairs. Fields in which this program is available include Business Administration, Economics, International Affairs, Political Science, Public Administration, and Public Affairs. Students must be admitted both to the National Law Center and, separately, to the School which will confer the Master's degree, and must meet all requirements in each degree program. It is possible for a student to complete work for both degree programs within four years.

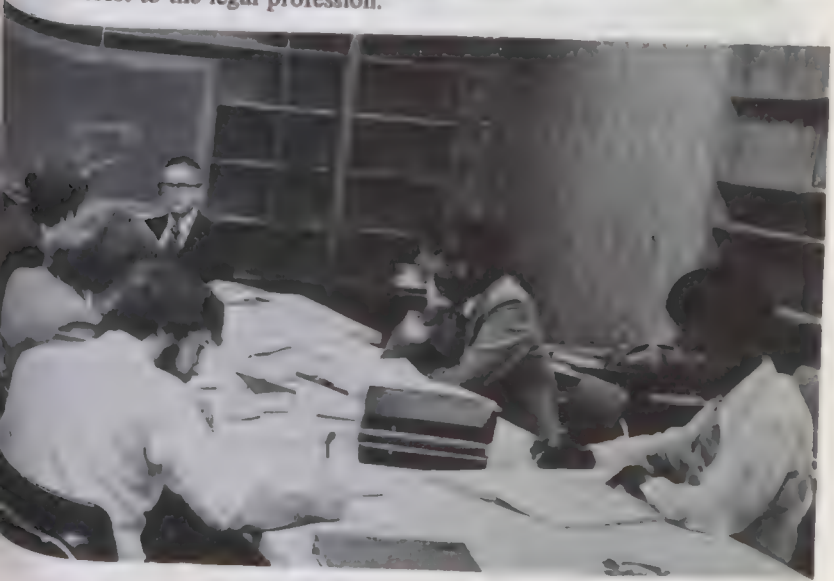
Master's and Doctoral Programs

THE ADMINISTRATION OF JUSTICE under law is a matter so vast and complex that some who hold the Bachelor of Laws or Juris Doctor degree feel the need for further study. The Master's and doctoral programs give students the opportunity to broaden and deepen their understanding of the law.

The Master of Laws candidate may follow a program of general study or concentrate in one of the specialized areas listed below. Courses in each of these areas are included in the 401–600 series. Graduates who complete their work in one of these areas may have the field of specialization noted on their diplomas.

Administrative Law: Economic Regulation
Corporation Law
Environmental Law
Government Procurement Law
International Law
Labor Law
Land Use Management and Control
Law and Poverty
Law, Psychiatry, and Criminology
Law, Science, and Technology
Patent and Trade Regulation Law
Taxation
Urban Legal Studies

Programs leading to the degree of Doctor of Juridical Science offer unusually talented advanced students, who have already earned the Master of Laws degree, the opportunity to concentrate on research and writing in a specific area of interest to the legal profession.



MASTER OF LAW

ENTRANCE REQUIREMENTS

A Bachelor of Laws, Juris Doctor, or equivalent degree from a law school which is a member of the Association of American Law Schools or is approved by the American Bar Association is required. The applicant must have demonstrated a high degree of academic excellence. Advanced standing is not granted for credits earned while a candidate for the first degree in law or for credits earned at other law schools.

DEGREE REQUIREMENTS

The student must complete a residence period of not less than two semesters, which should be continuous. All requirements for the degree must be completed in this Law Center and in a period not exceeding three years from the time of initial graduate registration, unless an extension is granted in writing by the Dean. The student must complete 24 semester hours of courses and writing projects with acceptable grades. For all courses taken within the Law Center a student must attain the grade of 65 or above. For approved courses taken outside the Law Center, the grade of either *CR* (Credit) or *NC* (No Credit) is assigned. To receive the grade of *CR* (Credit) in a course taken in other graduate divisions of this University, a student is required to attain the grade of *B* or better. To receive the grade of *CR* (Credit) in a course taken at Georgetown University through the Consortium of Universities of the Washington Metropolitan Area, Inc., a student is required to attain the grade of 80 or better. A minimum cumulative average of 75 is required at all times. The student is expected to include Law 599–600 *Thesis* in the 24-semester-hour requirement for the degree (for exception, see "Master's Thesis," below).

Candidates for the degree in a selected field of specialization must complete a minimum of 12 of the required 24 semester hours in courses and writing projects related to the selected field. Each Master of Laws program of study may include a limited number of courses numbered in the 300 series, with the approval of the Dean.

MASTER'S THESIS

Each candidate for the degree of Master of Laws is expected to write a Master's thesis (Law 599–600) under the supervision of a full-time member of the faculty of the National Law Center. Four hours of credit will be granted for successful completion of the thesis. The purpose of this requirement is to demonstrate the ability of the student to perform research in a special area of the law and to produce a scholarly paper containing the results of this research. The thesis is expected to be of substantially the same quality as a Law Review article. The Dean may waive the thesis requirement upon written request of the student, submitted no later than the beginning of the *final semester or summer session* before the student's graduation, provided the student has demonstrated research and writing ability by taking a minimum of 6 semester hours of course work designated "Research Paper." No thesis waiver is granted for candidates for the degree of Master of Laws with specializations in international law or government procurement law.

The thesis in its final form must be presented to the Adviser no later than the date specified in the Calendar. Two complete copies are required. It is the responsibility of the candidate to obtain from the Office of the Post-J.D. degree programs a printed copy of the regulations governing the styling and reproduction of theses. The mandatory thesis binding fee of $10 must be paid at the time of registration for the last semester's work.

Accepted theses become the property of the University and are placed in the Law Library, where the duplicate copies are bound and made available for circulation.

HONORS

The degree of Master of Laws "With Highest Honors" is awarded students who obtain a minimum cumulative average of 85.

GRADUATE COURSES IN OTHER DEPARTMENTS

Master of Laws candidates may be permitted to take graduate courses related to their fields of interest in other departments of this University. A maximum of 6 semester hours will be credited toward the degree for such courses; however, credit will be granted only if the courses are given on campus. The grade of *CR* (Credit) or *NC* (No Credit) will be recorded for such courses. Courses numbered 101–200 may be taken for graduate credit only if the student receives the approval of the instructor at the time of registration and does additional work, as prescribed by the department offering the course.





CONSORTIUM OF UNIVERSITIES OF THE WASHINGTON METROPOLITAN AREA, INC.

A candidate for the Master of Laws degree may take graduate courses Georgetown University Law Center through the Consortium of Universities the Washington Metropolitan Area, Inc. A maximum of 6 semester hours such courses may be credited toward the degree. Permission to take Consortium courses must be granted by the Dean, the Registrar, and the instructor offering the course. The grade of *CR* (Credit) or *NC* (No Credit) will be recorded for such courses.

DOCTOR OF JURIDICAL SCIENCE

ENTRANCE REQUIREMENTS

Admission to candidacy for the degree of Doctor of Juridical Science requires a Bachelor of Arts or equivalent degree from an approved college or university; a Bachelor of Laws, Juris Doctor, or equivalent degree, earned with high rank, from a law school which is a member of the Association of American Law Schools or is approved by the American Bar Association; a Master of Laws degree with high academic standing; outstanding capacity for scholarly work in the field of law; and faculty approval of the applicant's dissertation topic. Applicants must also demonstrate their writing ability by submitting the Master's thesis or a copy of one or more papers or articles which the applicant has written. Following consultation with the Dean, the applicant must obtain a faculty adviser, to be designated "committee chairman," from the regular full-time faculty; reach agreement on the acceptability of the proposed topic for the dissertation; and submit a detailed outline for the adviser's approval indicating by chapter and division within chapter the exact scope of the project. There should be a bibliography for each chapter, listing books, reports, cases, and law review articles to be considered. Although the outline cannot predict every detail of the subsequent research, it must be sufficiently definite to afford the Graduate Board a basis for evaluation.

Once the outline is approved, the applicant's "committee" is expanded to three members; this consultative committee must recommend the acceptance of the applicant to the full Graduate Board. The Board then acts upon the recommendation and may either accept or reject the applicant as an S.J.D. candidate. In no instance will any applicant be admitted to degree candidacy prior to the above procedures; however, the applicant may be registered as an Unclassified Student for purposes of course work requirements (see below). Approval for degree candidacy must be received within one year of the appointment of an adviser unless a written extension is granted by the Dean.

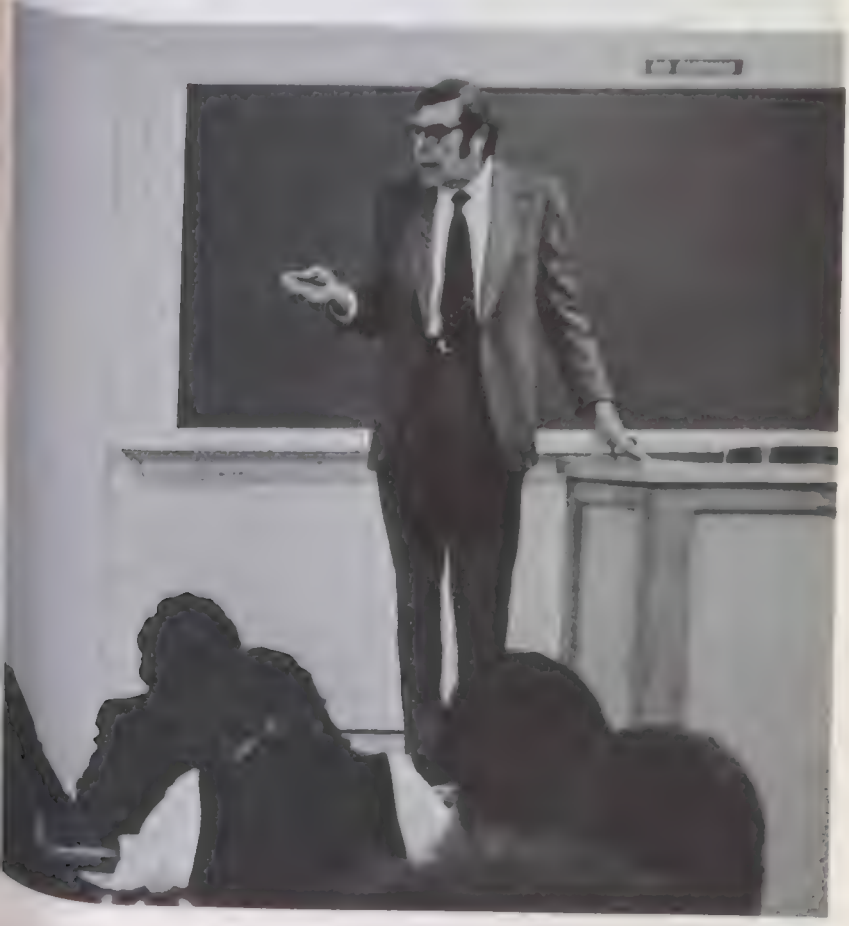
DEGREE REQUIREMENTS

The candidate must complete (1) a residence period of not less than one academic year; (2) a course of study and research—designated by the consultative committee and approved by the Graduate Board—of no less than 8 semester hours including *Jurisprudence*, unless previously taken; and (3) an acceptable dissertation. The dissertation must be submitted no later than three years from the date of admission to candidacy for the S.J.D. degree. The applicant who proposes to write on a comparative law topic must have

reading knowledge of the language in which the relevant materials are to be found. When the dissertation is submitted, the consultative committee will set the date for an oral examination. This examination is conducted by the consultative committee and such other members of the faculty and qualified experts as are selected by the Graduate Board.

No later than the date specified in the Calendar (see page 5), the candidate must submit to the Dean two complete copies of the dissertation and two copies of an abstract (not to exceed 600 words) of his dissertation.

Printed copies of detailed regulations regarding the form and reproduction of the dissertation and preparation of the abstract are available in the Office of the Dean. To be acceptable the dissertation must, in the opinion of the examining committee, constitute a substantial contribution to the field of law concerned and be suitable for publication. Additional information will be supplied by the Dean. Accepted dissertations become the property of the University and are placed in the Law Library, where the duplicate copies are bound and made available for circulation.



Degree Programs for Foreign Student

THE NATIONAL LAW CENTER has several programs of study available to student trained in law outside the United States. These programs fall into two genera categories: (1) those directed toward preparing students for a bar examina tion in an American jurisdiction and (2) those that enable students to return to their countries with a more thorough understanding of some aspects o American law.

A student with a degree from a foreign law school who has met the extremely competitive admissions criteria will be admitted to the Center as a candidate for the Master of Laws (LL.M.), the Master of Comparative Law (M.Comp.L. or Master of Comparative Law (American Practice) (M.Comp.L. (Am.Prac.) degree.

To prepare for admission to the bar of an American jurisdiction, the student may apply for either the Juris Doctor or the Master of Comparative Law (American Practice) degrees. The J.D. degree requires 84 semester hours of work in law school (credit is given for work in a foreign law school only in exceptional circumstances) and will qualify the student to take most U.S. bar examinations. The M.Comp.L. (Am.Prac.) degree requires 28 semester hours of work and satisfies the requirements of the District of Columbia Bar. *Students are cautioned to ascertain the requirements of the bar for which they intend to qualify prior to selection of their law school programs.*

Foreign students planning to return to their home countries may undertake a program leading to the degree of Master of Comparative Law. This degree program enables the student to gain a broader comprehension of the American legal system by taking basic courses in the Law Center. However, it is not intended to qualify a student to take a U.S. bar examination.

ADMISSION PROCEDURE

Application must be received from *foreign applicants* no later than June 1 for the fall semester (March 1 for candidates for the Juris Doctor degree), November 1 for the spring semester, and March 1 for the summer sessions.

REQUIRED RECORDS

Applicants must request all educational institutions attended to send directly to the Dean official credentials listing subjects studied, grades received, examinations taken, and degrees received. Original diplomas, certificates, and transcripts from secondary schools and all colleges and universities attended are required, but in exceptional cases certified copies will be accepted. Records of state examinations and certificates are also needed. All records become the property of the University and *cannot* be returned.

LANGUAGE TEST

Students whose native tongue is not English are required to take the *Test of English as a Foreign Language* and attain as an absolute minimum the score of 550 to be admitted to the National Law Center. This is a mandatory requirement. Students are responsible for making arrangements for taking the test and should address inquiries to TOEFL, Educational Testing Service,

Princeton, New Jersey 08540, U.S.A. The completed application form should be returned to the Testing Service at Princeton well in advance of the beginning of the semester for which the applicant seeks admission. The test fee, which should be remitted with the application, entitles the student to have the test score sent to three different institutions. Registration for the *Test of English as a Foreign Language* does *not* constitute application for admission to George Washington University.

The Bulletin of Information, obtainable without charge, contains a description of the test as well as rules regarding application, fees, reports, and the conduct of the test; lists of examination centers; examination dates; and an application blank. On the application for the test, the student should specify that the scores be sent to the Dean's Office.



ENTRANCE REQUIREMENTS

For the Degree of Juris Doctor.—Entrance requirements for foreign studen are the same as those stated on page 11, except that advanced standing is rare granted for study in foreign law schools.

For the Degrees of Master of Comparative Law and *Master of Comparati Law (American Practice).*—The entrance requirements are the successful com pletion of and graduation from a course in arts, philosophy, letters, or science equivalent to graduation from a gymnasium, lycee, or liceo; and graduation law with high academic standing from a recognized foreign university.

For the Degree of Master of Laws.—In unusual cases a foreign student wi be considered for admission to the Master of Laws program if he or she ha a graduate degree in law with high academic standing from an American university.

For the Degree of Doctor of Juridical Science.—The usual entrance re quirements are the successful completion of and graduation from a course i arts, philosophy, letters, or sciences, equivalent to graduation from a gymna sium, lycee, or liceo; graduation in law from a recognized foreign universit outstanding capacity for scholarly work in the field of law; and a Master o Laws degree with high academic standing from an American university.

DEGREE REQUIREMENTS

Juris Doctor, Master of Laws, Masters of Comparative Law, and *Doctor o Juridical Science.*—Degree requirements for foreign students are the same as those stated on pages 14–15, 20, and 22–23.

Master of Comparative Law.—The student must complete a residence perio of not less than two semesters, which should be continuous. All requirements for the degree must be completed in a period not exceeding three years from the time of registration for the degree. The student must complete satisfac torily 24 semester hours of approved courses of the Center, or of such other departments of the University as the faculty of the Center shall approve, and must maintain a cumulative average of at least 55.

Master of Comparative Law (American Practice).—The requirements for this degree are the same as those for the degree of Master of Comparative Law except that this degree requires 28 semester hours of course work with a cumu lative average of at least 65.

Unclassified Students

TWO TYPES OF STUDENTS may be admitted to the National Law Center as Un classified Students, in accordance with the following regulations:

1. A candidate for a Bachelor of Laws or Juris Doctor degree with an above average record at another law school which is a member of the Association of American Law Schools or is approved by the American Bar Association, may, at the discretion of the Dean, be admitted as an Unclassified Student to earn credits for transfer to the other law schools. Such students are normally ad mitted only to the summer sessions. They are admitted to the fall or spring semester only in unusual circumstances.

2. Graduates of law schools which are members of the Association of American Law Schools or are approved by the American Bar Association who wish to take advanced courses without pursuing degree programs may be admitted as Unclassified Students.

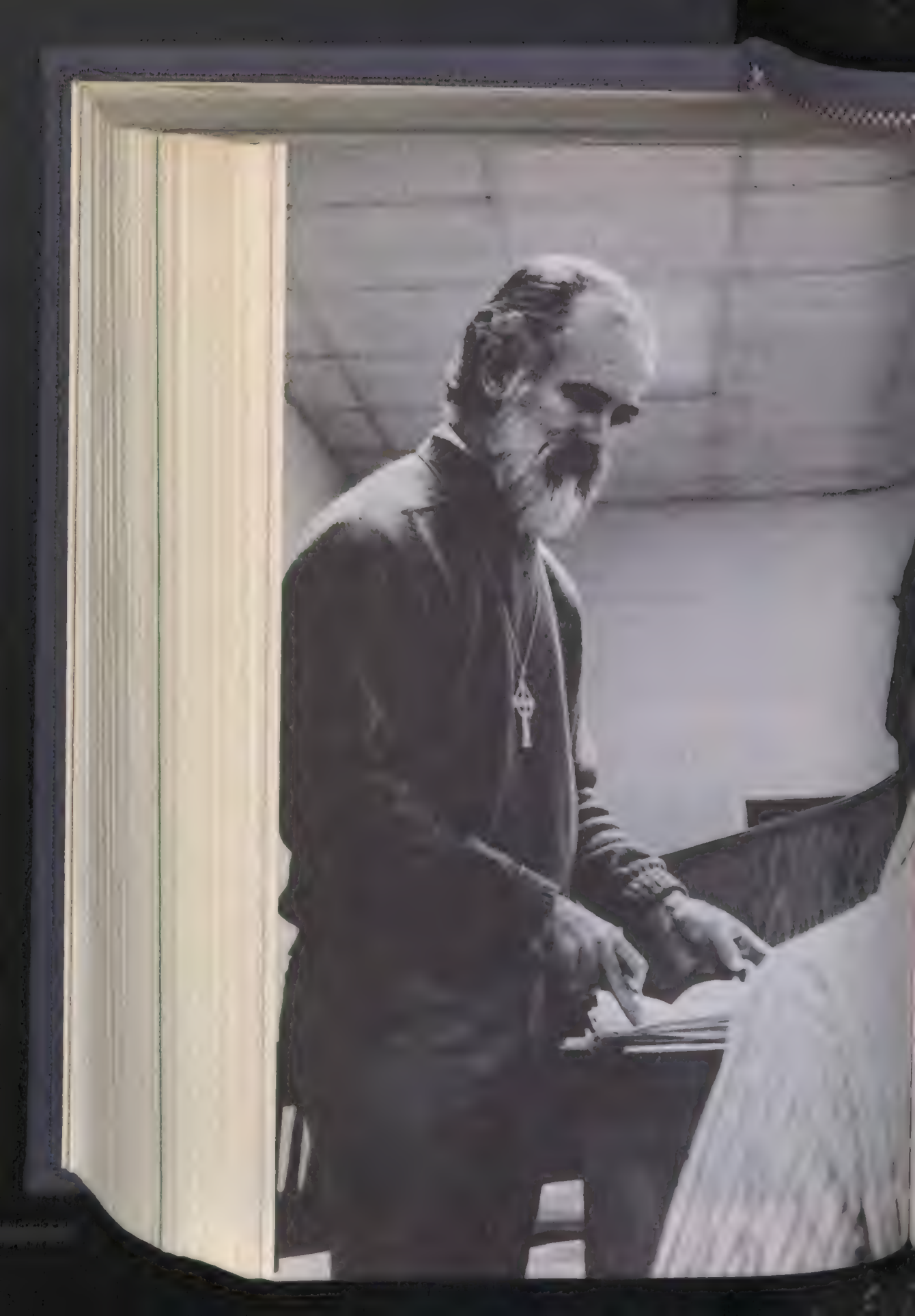
Unclassified Students participate in the work of the course, take examinations, and have their grades recorded. Credit for work earned as an Unclassified Student may not be applied to satisfy the requirements for a degree program unless express written approval is granted by the Dean at the time of admission.

Continuing Legal Education

MEMBERS OF THE BAR wishing to keep abreast of current developments in the law may register for any of the courses in the National Law Center on a non-credit basis as Continuing Legal Education students. Such students do not take examinations in courses and no grades are recorded for their work.

A simplified admission and registration procedure is used and must be completed on or before the last day of regular registration for the appropriate semester. Continuing Legal Education students pay only the tuition fee on the semester-hour basis. They may not participate in student activities or benefit from the medical privileges of the University. (Continuing Legal Education registrations are subject to cancellation if courses are filled by regularly registered students.)





GENERAL INFORMATION

THE NATIONAL LAW CENTER has an enrollment of 1,700 for the J.D. and Post-J.D. degree programs. Approximately 1,000 students are enrolled in the full-time day division for the J.D. degree and 400 are enrolled in the part-time evening division. Three hundred students, many from abroad, are enrolled in the Post-J.D. degree programs.

DAY AND EVENING CLASSES

Day classes meet in the mornings in 50-minute periods and in the afternoons in 50-minute periods and also in sessions of two 50-minute periods, Monday through Friday. Trial Practice Court and certain other courses meet for two-hour periods on Saturday mornings.

Evening classes meet from 5:50 to 7:40 p.m., Monday through Friday. A four-credit course, e.g., Evidence, meets two evenings a week; a three-credit course, e.g., Administrative Law, meets two evenings a week for one-half the semester and one evening for the other half; a two-credit course, e.g., Contracts II, meets one evening a week. The evening division conforms to the standards of the day division, the full-time faculty participating in the instruction.

Examinations for both day and evening classes may be given in the afternoon only. Examinations for day students may be given in the evening.

SUMMER TERM

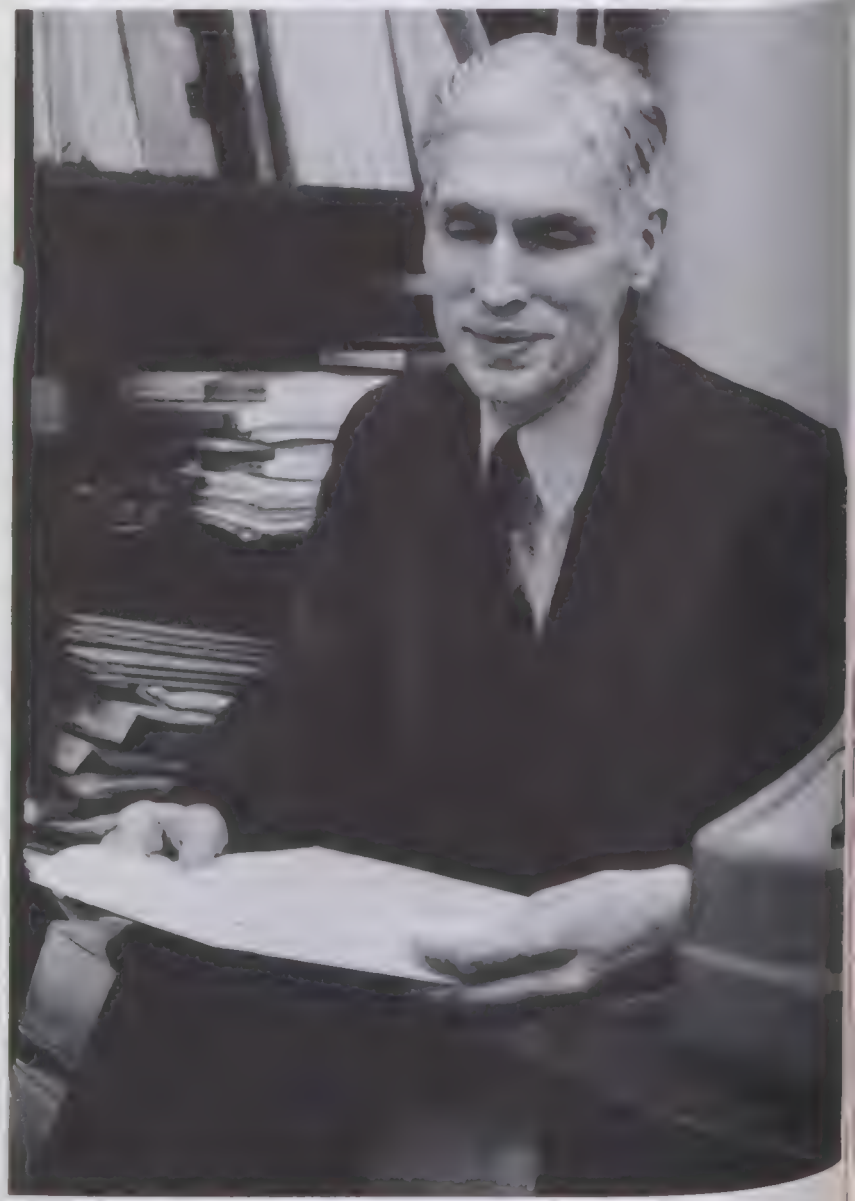
A term of two sessions, with day and evening classes, is offered in the summer. Students may register for either or both sessions. *No beginning students are admitted to the Juris Doctor program in the summer term.*

The summer term is shorter than a semester of the academic year, and, as a consequence, a student must attend two and one-half summer terms to receive residence credit for one academic year or attend one and one-half summer terms to receive residence credit for a semester.

A maximum of 6 semester hours may be taken each session by day students. Day students receive four-tenths of a semester of residence credit for each session of the summer term in which they are registered for 3 or more semester hours. A maximum of 4 semester hours may be taken each session by evening students. Evening students receive three-tenths of a semester of residence credit for each session of the summer term in which they are registered for 2 or more semester hours.

Admission

APPLICANTS ARE URGED to submit application forms and complete credentials well in advance of the semester for which they seek admission. In the selection process, there is no discrimination because of sex, race, color, or national origin. Two recent signed photographs and an application fee of $25 for a degree candidate, $5 for an Unclassified Student, must accompany the application.



Forms for application for admission or readmission are available at and should be returned to the Office of the Dean of the National Law Center, George Washington University, Washington, D.C. 20052.

For further details concerning students from foreign institutions, see pages 24–26.

APPLICATION FOR ADMISSION

Juris Doctor Program.—Beginning students are admitted only at the start of the fall semester.

The applicant should register with the Law School Data Assembly Service (LSDAS) by completing and mailing the registration form supplied with each application blank. A transcript from each college or university attended should then be sent directly to LSDAS, Educational Testing Service, Box 944, Princeton, New Jersey 08540. No transcript should be sent to the National Law Center. The LSDAS will analyze the transcript and send a copy to this law school and others designated on the registration form. If the transcript which has been forwarded to LSDAS does not show evidence of receipt of a Bachelor's degree, the applicant will be asked, upon acceptance, to submit a final transcript directly to the National Law Center.

To provide time for the evaluation of credentials of beginning students, all papers, including the Law School Admission Test score, should be received by the National Law Center before March 1. This means that the October or December Law School Admission Test should be taken (see "Entrance Requirements," page 11.

All papers of transfer students should be received by the Office of the Dean no later than May 1 for the fall semester, December 1 for the spring semester, and one month prior to registration for the summer session for which application is made.

For additional information, see the official *Pre-Law Handbook*, 1975–76 edition, available in October, 1975, and prepared by the Law School Admission Council and the Association of American Law Schools. This book includes material on the law and lawyers, pre-law preparation, applying to law schools, and the study of law, together with individualized information on most American law schools. It may be obtained at college bookstores or ordered from Educational Testing Service, Princeton, New Jersey 08540.

Master's and Doctoral Programs.—Students are admitted at the beginning of the fall semester, the spring semester, or any of the summer sessions.

Application for admission, together with all required credentials, must be received by July 1 for the fall semester, December 1 for the spring semester, and one month prior to registration for the summer session for which application is made.

Unclassified Students.—Lawyers who wish to take graduate courses are admitted at the beginning of the fall semester, the spring semester, or any of the summer sessions. Students who wish to earn credits for transfer toward a Bachelor of Laws or Juris Doctor degree at another institution may be admitted to the summer sessions if they are students in good standing at an accredited law school and have shown unusual ability in their law studies; they are admitted to the fall or spring semester only in unusual circumstances.

1. Application for admission, with required credentials, for a student who wishes to earn credits for transfer toward a Bachelor of Laws or Juris Doctor degree at another law school (see page 26), should be received at the Office of

the Dean at least one month prior to the first day of registration for the semes ter or summer session for which application is made.

2. Application for admission, with required credentials, for lawyers who wish to take graduate courses (see page 27), should be received at the Office of the Dean by July 1 for the fall semester, December 1 for the spring semester and one month prior to registration for the summer session for which applica tion is made.

READMISSION

A student who was previously registered but did not attend during the most recent semester (summer term excluded) should file an application for readmission. Closing dates for readmission are the same as those for admission (see "Application for Admission," page 31).

If the student has attended one or more higher institutions during his absence from the University or if he applies as a degree candidate and was previously a nondegree student, he must have complete, official transcripts sent to the Dean.

Registration

BEFORE ATTENDING CLASSES each student must register in person. No student will be registered until proper credentials have been filed and approved (see "Admission").

No registration is accepted for less than a semester or one summer session.

A student may not register concurrently in George Washington University



and another institution. Registration in more than one college, school, or division of the University requires the written permission of the deans concerned, *prior to registration.*

ELIGIBILITY FOR REGISTRATION

A student who is suspended or whose record is not clear for any reason is not eligible to register.

New Student.—Upon receipt of a *final letter* of admission a new student is eligible for registration on the stated days of registration.

Readmitted Student.—A student previously registered who was not registered for courses during the preceding semester or summer session must apply for and receive a letter of readmission (see "Readmission," above) before becoming eligible for registration.

TIME AND PLACE OF REGISTRATION

Registration is held in Stockton Hall, 720 Twentieth Street, N.W., during the following periods: *fall semester,* August 21 and 22, *spring semester,* January 12 and 13.

A late-registration fee of $15 is charged each student who is permitted to register after the regular registration days.

Registration may be changed only with the permission of the Dean.



Fees and Financial Regulation

THE FOLLOWING FEES AND FINANCIAL REGULATIONS were adopted for the aca
demic year 1975–76. (See page 35 for projected tuition and fee increases fo
1976–79.)

Tuition Fees

All law students except candidates for the degree of Doctor of Juridical Science:	
Full-time program (11 or more hours*), each semester	$1,250.00
Part-time program for all candidates for the degree for Juris Doctor, for each semester hour	94.00
Part-time program for students other than candidates for the degree of Juris Doctor, for each semester hour	96.00
Doctor of Juridical Science,† including the final examination	2,600.00

University Center Fee (nonrefundable)

For students registered for 11 or more semester hours:	
Each semester	46.50
For students registered for less than 11 semester hours in a semester:	
For each semester hour for which the student registers	4.35
For students maintaining "continuous registration" status:	
Each semester	4.35

Graduation Fees

Juris Doctor, Master's, Doctor's degrees	25.00
Fee for binding Master's Thesis	10.00

Residence Hall Fees (See page 49)

Special Fees

Application fee (degree candidate), nonrefundable	25.00
Application fee (unclassified student), nonrefundable	5.00
Application fee for room reservation, nonrefundable	100.00
Tuition deposit fee, nonrefundable, charged each student admitted to J.D. degree candidacy (payable in two installments—$100 by a date specified in the letter of admission, $350 by June 1)	450.00
Late-registration fee, for failure to register within the designated period	15.00
Continuous Registration fee, for post-J.D. students, to maintain "continuous registration" during any semester of absence from the University or after completion of tuition requirements.‡ Due and payable on the official days of registration	96.00
Late-payment fee, charged for failure to make payments when due (see "Payment of Fees," pages 35–36)	15.00
Replacement of lost or stolen picture identification card	2.00

* With the prior permission of the Dean, a J.D. degree candidate may take more than 14 semester hours after the first year of study.

† The tuition fee is to be paid at the rate of $650.00 a semester for four successive semesters, exclusive of the summer term or terms. No "continuous registration" fee will be charged if a third year is needed for completion of the degree requirements. If the Faculty should approve an extension of time, the student must maintain continuous registration and pay the continuous registration fee.

‡ The continuous registration fee applies toward neither financial nor residence requirements for the degree. This fee does not apply to students granted military leave (see page 47).

Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," page 35)	$35.00
Returned check fee, charged a student whose check is returned because of insufficient funds or for any other reason	15.00
Transcript fee, for each transcript of record	2.00

Registration on campus in the University entitles each student to the following University privileges: the services of the Student Career Services Office; the use of the University Library; gymnasium privileges; admission to all athletic contests, unless otherwise specified; subscription to the *University Hatchet*, the student newspaper; admission to University debates; medical attention as described under Student Health Service. These privileges terminate and a student is no longer in residence upon withdrawal or dismissal from the University.

PROJECTED TUITION AND FEE INCREASES 1976–79

In order that students and their parents may plan more realistically, tuition increases for the academic years 1976–77, 1977–78, and 1978–79 have been estimated as follows:

Increase by year (full-time students):

1976–77	$100.00
1977–78	200.00
1978–79	200.00

Increase by semester hour (part-time students):

1976–77	4.00
1977–78	7.00
1978–79	5.00

The University Center fee will be increased for the 1976 summer sessions and the academic year 1976–77. For students taking 11 or more semester hours, the fee will not be more than $52.50 a semester, a maximum increase of $6. Students taking less than 11 semester hours will not pay more than $5 a semester hour, a maximum increase of $.65.

Every effort will be made to keep tuition increases within the above limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment in these estimates.

PAYMENT OF FEES

No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees for each semester are due and payable in full at the Office of the Cashier at the time of each registration. Checks and postal money orders should be made out to George Washington University with student identification number shown in upper left hand corner.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for 6 semester hours or more may sign a deferred payment contract with the Student Accounts Office at the time of each registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance at the time of registration and the remaining half on or before

These yearly increases are also projected for the total fee for work leading to the degree of Doctor of Juridical Science.



October 22, 1975 (for the fall semester), and March 10, 1976 (for the spring semester). Interest at the rate of 8 per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $575 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late-payment fee and will be subject to the interest charge of 8 per cent per annum. Accounts which become 30 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits his right to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

PREPAID AND DEFERRED PAYMENT PLANS

Several commercial programs for those who wish to pay for college on a monthly basis are available. Terms and conditions vary, but most provide a life insurance policy in the contract. For specific details and applications, address inquiries to the following:

1. Girard Edu-Check Plan, 2nd and Chestnut Streets, Philadelphia, Pa. 19106
2. Richard C. Knight Insured Tuition Payment Plan, 6 St. James Avenue, Boston, Mass. 02100
3. The Tuition Plan, Inc., Concord, N.H. 03301

The University's Office of Student Financial Aid does not maintain a supply of applications for these various programs, but will be happy to provide guidance to students and parents.

WITHDRAWALS AND REFUNDS*

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Withdrawal from courses is permitted after the midpoint of a semester only in extraordinary circumstances. Notification to an instructor is not an acceptable notice.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

1. *Complete withdrawal* from the University:

FALL SEMESTER†

Withdrawal dated on or before August 29, 1975.....90 per cent
Withdrawal dated September 1 to September 12, 1975.....75 per cent
Withdrawal dated September 15 to September 26, 1975.....50 per cent
Withdrawal dated after September 26, 1975.....none

SPRING SEMESTER

Withdrawal dated on or before January 23, 1976.....90 per cent
Withdrawal dated January 26 to February 6, 1976.....75 per cent
Withdrawal dated February 9 to February 13, 1976.....50 per cent
Withdrawal dated after February 13, 1976.....none

2. For a *change in status from full-time to part-time student* or for *partial withdrawal by a part-time student*, the above schedule applies to the difference in charges between the original program and the adjusted program continuing in effect.
3. A student enrolled in a full-time program who drops or adds a course and continues to be in a full-time program will have no financial adjustments of tuition made other than those involving course fees.
4. A student who is granted military leave before completing the semester will receive credits for current charges in accordance with the schedule for

*Regulations covering withdrawal and refunds for the summer session are stated in the *Summer Session Catalogue.*

†No refund of the $100 and $350 deposits required of entering students is granted.

complete withdrawal from the University (see No. 1, above). Payments made in excess of the nonrefundable balance will be refunded to the student. The nonrefundable balance will be maintained as a deferred credit for use by the student when he returns to the University (see "Military Leave," page 47).

5. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

In no case will tuition be refunded or reduced because of absence from classes.

Payment applies only to the semester for which a registration charge is incurred and will not be credited to another semester (exception: students granted military leave, see page 47).

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

Financial Aid

THE NATIONAL LAW CENTER has been able in recent years to assist many students in obtaining the financial aid they require, through full or partial scholarships, various loan programs, part-time employment, or a combination of these kinds of assistance.

GRADUATE AND PROFESSIONAL SCHOOL FINANCIAL AID SERVICE

The National Law Center participates in the Graduate and Professional School Financial Aid Service (GAPSFAS), which provides an analysis of an applicant's financial needs. Entering students wishing to receive financial aid should request the materials from GAPSFAS, Education Testing Service, Box 944, Princeton, New Jersey 08540. The information provided by the applicant and the applicant's parents will be analyzed, and a copy of the report will be sent to the Law Center. In addition, students entering the National Law Center who desire to be considered for a scholarship must submit a letter to the Law Center by March 1 outlining their academic qualifications, their extracurricular activities, and their reasons for believing a scholarship award to them is justified.

Students needing financial assistance should file with GAPSFAS in time for their reports to be received at the Law Center as early as possible since the Committee on Student Financial Aid of the Center will begin making awards in March, and available funds are limited.

No awards will be made to an entering student until his admission has been finalized.

JURIS DOCTOR PROGRAM

SCHOLARSHIPS AND RESEARCH ASSISTANTSHIPS

Application and correspondence concerning scholarships and research assistantships should be sent directly to the Dean. Unless otherwise specified, application and supporting credentials should be submitted no later than March 1 preceding the period for which the award is made.

Arent, Fox, Kintner, Plotkin & Kahn Scholarship (1973).—Scholarship aid for needy law students from the Washington, D.C., area.

Mildred Gott Bryan Scholarship Fund (1965).—Partial scholarship aid for students in the National Law Center.

Charles Worthington Dorsey Memorial Scholarship (1947).—Memorial to Charles Worthington Dorsey, LL.B. 1881, LL.M. 1882. A full-tuition scholarship for the course leading to the degree of Juris Doctor, awarded to a needy and promising graduate of this University with a Bachelor of Arts or equivalent degree. Ordinarily this scholarship is awarded once every three years.

Honor Scholarships.—Two scholarships available each year to students entering upon full-time study. Each scholarship provides a cash award for the first year, in addition to tuition aid, in an amount depending on need, for all three years. These scholarships are awarded on the basis of outstanding college records, both academic and extracurricular; Law School Admission Test scores; and need. To retain the scholarship for the second and third years, the candidates must maintain a *B* average, both for each year and cumulative.

Law Center Tuition Remission.—For students from minority groups, based on financial need.

Phi Delta Delta Scholarships (1959).—Zeta Chapter of Phi Delta Delta Legal Fraternity (International), provides tuition aid to a woman student in the second year of the Juris Doctor program who excelled in scholastic achievement and service to the Center in her first year.

Research Assistantships.—Available each year to students currently enrolled. Each assistant receives an annual stipend. Awards are made on the basis of academic standing, financial need, capacity for leadership, and research and writing potential. Applications should be submitted no later than July 1.

Research Scholarships.—Available each year to students currently enrolled, preferably to applicants who are completing the second year. Scholarship awards are made on the basis of academic standing, financial need, capacity for leadership, and research and writing potential. Applications should be submitted no later than June 1.

Trustee Scholarships.—Scholarships awarded each year to entering students, for tuition aid, in an amount depending on need, in the morning division. Candidates must have demonstrated qualities of leadership in addition to scholastic attainment. To retain the scholarship, the successful candidate must maintain a *B* average, both for each year and cumulative. Application must be made to the Dean before March 1.

Tuition-aid scholarships are also available to continuing second- and third-year full-time students with demonstrated scholastic ability, on the basis of financial need and capacity for leadership. Application should be made to the Dean prior to June 1.

Frank S. Whitcomb Scholarship Fund (1971).—Bequest of Frank S. Whitcomb for the purpose of aiding and assisting worthy young men and women in securing a legal education.

LOAN FUNDS

Through the generosity of friends of the University a number of loan funds are available. Among them are the Robert Ash Loan Fund; the George R. Keneman Loan Fund; the Morris and Gwendolyn Cafritz Foundation Minority Law Student Loan Fund; the Robert M. and Mary McConnel Cooper Loan Fund; the Robert McKinney Cooper Memorial Loan Fund; the District of

Columbia Bar Association Loan Fund; the J.W. Ehrlich Foundation Loa Fund; the Harold L. and Violet George Foundation Loan Fund; the Georg Washington Law Association Loan Fund; the Jephson Educational Trust Loa Fund; the Law Association Loan Fund for the law classes of 1912, 1918, 192 1924, 1929, 1931, 1933, 1935, 1936, 1937, 1938, 1939, 1941, 1942, 194 1950, 1951, 1952, 1953, 1955, 1959, 1960, 1961, 1962, 1963, 1964, 196 the Oscar Lawler Memorial Loan Fund; the Horace L. Lohnes Memorial As sistance Fund; the Jessie B. Martin Loan Fund; the Mike Pelekiri Loan Fund the W. Theodore Pierson Loan Fund; and the Orville Hassler Walburn Memo rial Loan Fund.

In addition, financial assistance is available through the Guaranteed Student Loan Program, National Direct Student Loans, the American Bar Association Loan Program, and other sources.

Application for financial assistance should be made in the Office of the Dean

MASTER'S AND DOCTORAL PROGRAMS

FELLOWSHIPS AND SCHOLARSHIPS

Application should be made before March 1 preceding the period for which the award is made. The applicant should submit an application for admission as a degree candidate and a personal letter applying for a fellowship to the Dean. The letter of application should contain complete biographical data, information as to experience in practice or teaching, and copies of or citations to published legal writings, and such other information the student believes will be of assistance in the consideration of the application. Applicants should arrange for letters of recommendation to be sent from two members of their law faculty directly to the Dean. The applicant's academic rank in class should be included either in the transcript of the law school or in the letters of recommendation.

Teaching Fellowships.—Two or three fellowships available each year with a stipend of $8,000 plus tuition for an approved course of study leading to an advanced degree. Teaching fellowships are awarded for a term of two academic years. Fellows conduct the first-year course in Legal Research and Writing and work with the students to improve their legal writing ability. By arrangement with the Dean, they may also be given the opportunity to teach additional courses.

Richard Paul Momsen Scholarships for Brazilian Graduate Law Students.—Bequest of Richard Paul Momsen, LL.B. 1912. Awarded 1974–75 and alternate years, for the study of U.S. constitutional law and the law of patents and trademarks.

Prizes

Jacob Burns Prize.—Established by Jacob Burns, a law alumnus and Trustee of the University. A medal and $100 awarded annually to each of the two members of the winning team in the upperclass Van Vleck Moot Court competition.

Ogden W. Fields Graduate Prize.—Fifty dollars awarded annually to the

graduate student who has demonstrated the highest overall proficiency in a course in labor law.

Charles Glover Prize.—Established by Charles Carroll Glover, Jr., an Honorary Trustee of the University, in memory of his great-grandfather, an illustrious member of the bar of the District of Columbia. Consists of selected law books. Awarded annually to the student who has attained the highest average grade in the third-year, full-time course.

Kappa Beta Pi Prize.—Awarded by Eta Alumnae Chapter to the woman law student who attains the highest average for the first year.

John Bell Larner Prize.—By bequest, a medal awarded annually to the member of the graduating class who attains the highest average grade in the entire course for the degree of Juris Doctor.

John Ordronaux Prizes.—By bequest, $75 awarded annually to the student who has attained the highest average grade in the first-year full-time course; and $75 to the student who has attained the highest cumulative average grade at the end of the second-year, full-time course.

United States Law Week Award.—Presented to an outstanding senior law student.

Jennie Hassler Walburn Prize.—A cash reward to the outstanding student in the field of civil procedure, established by the will of the late Professor Orville Hassler Walburn in memory of his mother.



ACADEMIC WORK LOAD

Juris Doctor Candidates.—Juris Doctor candidates without substantial outside employment may take a program of studies of 14 hours a week. Such students may take courses in the evening only if they are not scheduled in the daytime and if a majority of the hours taken are in day courses. The Dean is authorized to approve programs of study of more than 14 hours in exceptional cases; however, no program will be approved which would permit the student to complete requirements for the degree in less than 28 months after beginning the first year of law study. Students with 20 hours or more of outside employment, whether in the day or evening division, must take a limited program of studies not exceeding 10 hours a week. Students taking a majority of their classes in the evening may not take more than 10 hours a week; the minimum load is 8 hours, except in special cases where 6 may be approved by the Dean for a limited time. A minimum schedule of 11 hours in the day division is required except in exceptional circumstances when a reduced program is authorized by the Dean.

Students taking more than 8 hours in the day division or 4 hours in the evening division must have the permission of the Dean to take a Bar Review course.

Students may transfer from the day division to the evening division only with the permission of the Dean.

With the approval of the Dean, second- and third-year students may take a maximum of 6 semester hours of appropriate courses in other departments of the University; such a student must receive a grade of at least *B* to obtain credit for such courses, and in no event will the grade count in computing the cumulative average.

Master's Candidates.—Master's candidates without substantial outside employment may take a maximum of 12 hours a week. Students with 20 hours or more of outside employment must take a limited program of study not to exceed 8 hours a week. The minimum load is 4 hours unless approval for fewer hours is given by the Dean for a limited time.

ATTENDANCE

Regular attendance at classes is required and is necessary for successful work. A student who is deficient in class attendance in any course may be barred from taking the examination.

CHANGES IN PROGRAM OF STUDIES

A student may not add courses or change from one section to another of the same course without the approval of the Dean. Students may drop courses only with the written approval of the Dean. In addition, approval of the instructor is ordinarily required unless the request is made early in the semester. Under no circumstances may any student drop a course after the last day before regularly scheduled examinations begin in any semester or summer session.

RESEARCH PAPER IN LIEU OF EXAMINATION

The preparation of a research paper is required in lieu of an examination in seminars and in other courses, as indicated in the course descriptions. Any research paper must be submitted by the first day of the examination period (the first day any examination is given in any course). For sufficient reason, the instructor may extend the time beyond this date to a later date, subject to the following conditions: (1) no student will receive any credit for the course for any purpose until a paper acceptable to the instructor has been submitted; (2) if a paper is submitted after the last day of examinations (or the last day before registration for the spring semester), the only grade the student may receive for the course is *CR* (Credit) or *NC* (No Credit), except that failure ultimately to submit any paper for the course will result in a grade of 45. Students who are candidates for the J.D. degree may register for one such course in each semester of their third year; with the approval of the Dean such students may register for more than one such course each semester. Approval of the Dean is required for second-year students to take such courses.

EXAMINATIONS

Written examinations are held at the end of most courses. Every student is required to take the regular examinations unless excused. No excuse for ab-



sence will be granted except by the Dean and then only for illness or other emergency. Application for excuse must be made in writing not later than one month after the date of the examination. A student excused from a final examination will be permitted to apply to the instructor for a Credit/No Credit determination. The instructor will select the mode of determination (for example, a make-up examination or paper). The student will have the option of (1) complying with the instructor's procedure of determining Credit/No Credit, or (2) having the grade *I* (Incomplete) entered on the record and taking the next regularly scheduled examination for a numerical grade. The examination may not be taken after exclusion for low scholarship.

Permission to take an examination before the regularly scheduled date will not be granted. Permission to take a postponed examination is limited to the situations provided for in the preceding paragraph.

A student who has been excused from taking a regular examination and who is a candidate for a degree to be conferred prior to the next regular examination in the subject may petition the Scholarship Committee, which may authorize such action as the circumstances require.

If a student fails to take an examination, a grade of 45 will be recorded unless the student has been excused from the examination as provided above or has obtained the Dean's permission to drop the course.

CREDIT/NO CREDIT OPTION

Candidates for the degree of Juris Doctor may take, in addition to courses regularly given on a "Credit/No Credit" basis, 12 semester hours of elective course work on a "Credit/No Credit" basis, and will receive a grade of "Credit" if the course is satisfactorily completed with a grade of 65 or better. No student may change from a numerical grade to a "Credit/No Credit" basis in a course during the last four weeks of classes except with the permission of the instructor. An unexcused failure to take an examination in a course or failure to submit a required research paper will result in the recording of a grade of 45 for a course taken on a "Credit/No Credit" basis.

No student may take more than 17 semester hours of courses (including Law 220 and also courses regularly given on a "Credit/No Credit" basis) on a "Credit/No Credit" basis.

Students are advised to consider carefully the advisability of electing to take courses on a "Credit/No Credit" basis. In the opinion of the faculty, a student's election to take courses on a "Credit/No Credit" basis may, in view of the importance apparently attached to grades by educational institutions and employers, be detrimental to the student's career in the legal profession.

GRADES

Grades are given in numerical terms equivalent to letter grades as follows: 85–100, *A*, Excellent; 75–84, *B*, Good; 65–74, *C*, Satisfactory; 55–64, *D*, Poor —below standard for graduation; 45–54, *F*, Failure. In courses Law 220, 321, 322, 323, 342, 343, 345, 346, 385, 399, 459, 479, 487, 509, 579, and 593 grades are *CR*, Credit; *NC*, No Credit. A student who has been excused from failure to take a regularly scheduled examination is given the grade of *I*, Incomplete. See "Examinations" (pages 43–44) for grade upon failure to take an examination. Grades between 55 and 100 indicate that the work has been completed and credit given. Grades between 55 and 64, however, do not represent

satisfactory work and adversely affect a student's cumulative average. No credit is given to J.D. candidates for grades below 55 or to post-J.D. candidates for grades below 65. No grade may be changed by an instructor after it has been posted in the law school or disclosed to a student unless there has been an error in arithmetic certified in writing as such by the instructor.

Any student who receives a grade below 55 (*F*) has the right to retake the course once, from the same or a different instructor, but only within the next academic year. (This does not apply to post-J.D. students.) The grade received in the retaken course shall be entered into the student's record in addition to the original grade, and both grades shall be included in computing the student's average. A student may exercise the right to retake a course only with respect to two different courses during study at the Law Center.

The cumulative average of a student includes all grades in all courses taken while a candidate for a particular degree. When a course is repeated (see "Academic Dishonesty," page 42), both the first grade and the subsequent grade or grades are counted in the cumulative average.

EXCLUSION AND PROBATION FOR POOR SCHOLARSHIP

Candidates for the Degree of Juris Doctor.—A student whose cumulative average at the end of any semester falls below 65.0 but is above 64.0 will be put on probation. If such a student fails to raise the cumulative average to 65.0 at the end of the next semester, the student will not be permitted to register for any succeeding semester unless the student petitions for and receives the permission of the Scholarship Committee.

A student whose cumulative average at the end of any semester falls below 64.0 will not be permitted to register for any succeeding semester unless the student petitions for and receives the permission of the Scholarship Committee to register.

A student who fails more than one course over the entire period of law study will not be permitted to register for any succeeding semester or to graduate unless the student petitions for and receives the permission of the Scholarship Committee.

A student who is not permitted to register under the foregoing provisions will be excluded as of the beginning of the semester for which the student was ineligible to register.

Students who are registered at the time they receive notice that they will not be permitted to register for the next semester are entitled to withdraw from school and to receive a full refund of the tuition paid for the semester, or to complete the work for which they are registered.

Any student excluded may petition for reinstatement; if the student can demonstrate that the low grades were due to circumstances beyond the student's control and that the student has the capacity to pursue the study of law with a definite likelihood of success, that student may be readmitted subject to such conditions as may be imposed by the Scholarship Committee.

Despite the above provisions, a student will be allowed to complete the first two semesters of law study before being denied permission to register for a succeeding semester.

For this purpose the term "semester" includes a session of the summer term.

Candidates for Masters' and Doctoral Degrees.—A candidate for a master's or doctoral degree whose work is not satisfactory in the opinion of the faculty,

taking into consideration the requirements and standards for the degree, ma by action of the faculty, be excluded at the end of the semester for which t candidate is currently registered.

A cumulative average of 75 is required for the Master of Laws degree. student whose cumulative average falls below 75 at anytime will be ineligib for continuation in the program without the permission of the Dean. Such student will not be permitted to register for any succeeding semester unless th student petitions for and receives the permission of the Dean or the Board fo Graduate Studies.

Unclassified Students.—An unclassified student whose work is not satisfa tory may be excluded at the end of the semester for which the student is cu rently registered.

SUMMER SCHOOL CREDIT

Students planning to attend summer school sessions at other law schools and desiring to use credits obtained at such schools in their Juris Doctor program at this Center must first have the courses they wish to take approved by the Dean. In no event will credits be given for unsatisfactory work or be recog nized in excess of those which might be obtained in a similar period in this program.

TRANSCRIPTS OF RECORD

Official transcripts of student records will be issued on request of the student or former student. A $2 fee is charged for each transcript. No transcript will be issued for a person who does not have a clear financial record.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until all degree requirements are satisfied. By failing to register for one semester or more, the student breaks his registration and must be readmitted (see "Readmission," page 32). A "Readmitted Student" is required to satisfy the curriculum requirements existing at the time of his readmission. Post-J.D. students who have completed course registration may maintain continuous registration by paying the "continuous registration" fee (see page 31); *J.D. degree candidates may not maintain continuous registration by paying the "continuous registration" fee.*

GRADUATION REQUIREMENTS

Diplomas are awarded at a February Convocation, at a May Commencement and in September.

To be recommended by the Faculty for graduation, a student must have met the admission requirements of the National Law Center; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which the student is registered; and be free from all indebtedness to the University. Registration, either for course work or on the "continuous registration" fee basis, is required for the semester or summer session immediately preceding the awarding of the degree.

Application for Graduation.—An "Application for Graduation" form must

be filed and the appropriate fee paid at the time of registration for the last semester or summer session of the final year. Students completing degree requirements during the Summer Sessions will be awarded diplomas (no formal convocation) September 30, *provided* they have completed all degree requirements and have applied for graduation as a part of registration for the Summer Sessions.

ACADEMIC DISHONESTY

The University community, to fulfill its purposes, must establish and maintain guidelines of academic behavior. Although all members of the community are expected to exhibit honesty and competence in their academic work, incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper university channels.

Copies of the University policy on academic dishonesty can be obtained from the following offices: all department chairmen, all academic deans, and the Vice President for Academic Affairs.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of active duty, upon presentation to his Dean of a copy of his orders and a petition for such leave. The maintenance of "continuous registration" is not required of the student on military leave; however, he must apply for readmission to the University well in advance of the semester in which he expects to return. Payments for tuition and fees which are not refunded to the student at the time he is granted military leave will be maintained as a deferred credit for his account and use upon return to the University.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions which are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must:

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate; and
3. receive the student's written consent before releasing information from his or her education records to persons outside the University, except for directory information as indicated below. Personally identifiable information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency.

The University will release the following directory information upon request: name; telephone number; dates of attendance; school, college, or division of

enrollment; field of study; credit hours earned; degrees earned; and honor received. A student who does not wish such directory information release must file written notice to this effect in the Office of the Registrar.

University guidelines on the release of student information may be obtained from the Office of the Registrar.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

RIGHT TO DISMISS STUDENTS

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, the student's registration may be canceled and the student will be ineligible (except by special action of the Faculty) for subsequent registration.

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" Office is maintained in the Campus Security Office.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 101–3) contains regulations recently approved by the University's Board of Trustees.

University Computer Center

THE UNIVERSITY COMPUTER CENTER is located on the first floor of Stuart Hall, 2013 G Street, N.W. The facilities of the Center are available for academic purposes to all registered students and to members of the instructional staff. The Center has as its principal mission the provision of a powerful computing system which serves the University in its educational and research endeavors. The Center's programming staff concentrates its efforts in conducting faculty and staff seminars, consulting with users in the preparation of complicated programs, and carrying out computer-oriented research.

The Computer Center equipment consists of an IBM system 370 model 145 computer with large capacity on-line disk storage, a card read/punch, a high-speed line printer, and four tape drives. A Remote Job Entry (RJE) station

also available. The principal languages available to the user are FORTRAN IV, COBOL, Programming Language One (PL/1), Assembler Language, and ALGOL. In addition, numerous utility, statistical, data manipulation, and simulation systems and special languages are available in the library of programs. Facilities are available on a first-come, first-served basis for preparation of programs and data.

Computer programming courses are offered by the School of Government and Business Administration, the Department of Statistics, and the School of Engineering and Applied Science. In addition, many other departments offer courses that utilize the computer as a research adjunct to course work.

The Computer Center is normally open 24 hours a day, seven days a week.

Student Services

RESIDENCE HALLS

COMPLETE INFORMATION concerning the University's residence halls is available from the Director of Housing, George Washington University, Washington, D.C. 20052. Information concerning off-campus housing near the University may be obtained at this Office. The reservation of rooms in private houses must be made by students.

Admission to the University does not include a room reservation. Information concerning housing may be obtained by writing directly to the Director of Housing, George Washington University, Washington, D.C. 20052.

1975–76 RESIDENCE HALL RATES PER PERSON FOR TWO SEMESTERS*

Madison Hall, double room, $975 per student; Graduate Hall, apartment for two or three (apartments in this hall have kitchen facilities), $1,025 per student.

FOOD SERVICE*

Food service is available from August 28 through December 17, 1975, and from January 15 through May 8, 1976, with vacation periods and holidays excluded. The rate for the seven-day, 20 meals per week plan is $764 for the academic year; the rate for the five-day, 15 meals per week (Monday through Friday) plan is $725 for the academic year. The well-balanced meals are served cafeteria-style.

MUNSON HALL APARTMENTS

Munson Hall is a University-owned and operated apartment house containing 35 one-bedroom and 54 efficiency apartments. Graduate and married students are given priority for residence until July 15 each year. All leases are for one 12-month year.

*Residence hall and food service prices subject to change.

CLOYD HECK MARVIN CENTER

The Cloyd Heck Marvin Center serves as the campus community center, providing services, conveniences, and recreational and social opportunities for students, faculty, staff, alumni, and guests. Its wide range of facilities provides the setting for a variety of programs conducted by the University Program Board; the departments of Drama, Dance, and Music; and other student and faculty organizations.

A two-board structure, representative of all elements of the University community, plays an important role in the day-to-day functioning of the Center. The Governing Board and the Operations Board work closely with the full-time staff in the development of procedures and policies which provide a framework for the Center's operation.

STUDENT HEALTH SERVICE

The Student Health Service is a general outpatient clinic designed to assist students registered on campus with their health needs. This Service is located at 935 22nd Street, N.W. (in the H.B. Burns Memorial Building).

Physicians are available by appointment from 9 a.m. to 4:45 p.m., Monday through Friday. In addition, physicians are available for walk-in patients from 6 p.m. to 10 p.m., Monday through Friday, and from 9 a.m. to 12 noon on Saturday. This schedule is also maintained during the Summer Sessions, except that the evening closing hour Monday through Friday is 9 p.m.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. This arrangement is for emergency care only, and all fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. A student who is not currently enrolled or who has severed his connection with the University is ineligible for medical benefits of the Student Health Service. Any student may engage, if he so desires, physicians and nurses of his own choice, but he will be responsible for all the fees charged. The bills incurred from all services rendered outside of the Student Health Service (for example, X-ray work and referrals to specialists or other outside physicians) are the responsibility of the student. Within the Student Health Service, there will be only a few small charges for some services such as materials for an allergy injection series, overseas immunizations, and certain other services.

Any student who intends to train for an athletic team is required to pass a thorough medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Human Kinetics and Leisure Studies.

HEALTH AND ACCIDENT INSURANCE

The Student Health Service Office has arranged for Health and Accident Insurance, on an elective basis, for *full-time* students registered on campus. Interested students should contact the Student Health Service Office.

STUDENT EMPLOYMENT

The Law Center helps in the placement of its students and maintains a placement service for that purpose. In addition, the Student and Alumni Career Services Office, Woodhull House, 2033 G Street, N.W., provides assistance to students seeking full-time, part-time, or temporary employment. This Office maintains a registry of positions available and refers qualified applicants for consideration. Information is also available on Civil Service examinations.

A student taking more than 10 semester hours must limit outside employment to less than 20 hours (see "Academic Work Load," page 42). It is urged that full-time students refrain from engaging in outside employment during their first year. Although work in some special areas may contribute to the learning and experience of the student, as a general rule it will compete with time needed for adequate study and preparation, which are at the heart of a good legal education.

PLACEMENT SERVICE

The Law Center takes a continuing interest in the placement of its graduates in private practice and governmental service as well as with industry and commerce. The Dean, the Faculty, and the Placement Office cooperate in collecting information from alumni, law firms, and government agencies concerning opportunities in legal positions throughout the country. Senior law students and recent graduates are urged to keep in touch with the Placement Office.

VETERANS EDUCATION

The Office of the Registrar, Luther Rice Hall, 2121 Eye Street, N.W., assists students entitled to educational benefits as veterans, widows, or war orphans with any problems which may arise concerning their benefits. This Office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans, widows, or war orphans should consult the Office of the Registrar prior to submitting application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 20421.

COURSES OF INSTRUCTION

THE COURSES OF INSTRUCTION listed below are subject to change. The Univer-
sity reserves the right to withdraw any course announced.

The number of hours of credit given for the satisfactory completion of a
course is indicated in parentheses after the name of the course. Thus, a year
course giving two hours of credit each semester is marked (2–2), and a semes-
ter course giving two hours of credit is marked (2).

In most courses, a final examination is held during the examination period
and the grade in the course is determined in large part by that examination.
These courses are parenthetically marked "Examination."

Courses that require the preparation of a major research paper in lieu of an
examination are parenthetically marked "Research Paper." The satisfactory
completion of such a paper by a student individually will satisfy the Legal
Writing curriculum requirement for the J.D. degree.

Courses parenthetically marked "Problem Assignments," "Writing Assign-
ments," "Take-home Examination," "Choice of Paper or Examination," or
"Clinical Work" indicate the nature of the method planned by the instructor
for determining in major part the grade he will give for the course. A course
marked with any of these designations will not satisfy the Legal Writing curric-
ulum requirement for the J.D. degree.

Day classes begin at 9:10 a.m. and run throughout the entire morning and
afternoon. Evening classes begin at 5:50 p.m. Many examinations for both
day and evening classes may be given in the afternoon only. Examinations for
day students may be held in the evening.

A parenthetical designation at the end of a course description indicates
whether the course is scheduled to be offered in the spring or fall semester or
in the summer sessions, and also usually whether it will meet in the day or
evening. When a double-numbered course is designated "Academic year," the
first half of the course is scheduled to be offered in the fall, the second half
in the spring. Courses with no parenthetical designation indicating time of
offering are not scheduled to be given during the 1975 summer sessions or the
1975–76 academic year.

COURSES FOR JURIS DOCTOR CANDIDATES

Required courses are numbered from 201 to 300. Courses numbered from 301
to 400 are normally taken by second- and third-year students. Courses num-

bered from 401 to 600 are generally more advanced. Second-year students may take courses numbered above 400 only with the permission of the Dean. Third-year students are encouraged to take one course numbered above 400 each semester, and may take more than one such course with the permission of the Dean.

The following courses are among those offering clinical work: Law 343, 345, 346, 394, 396, 399, 458, 459, 479, 487, 508, 509, 579.

REQUIRED COURSES

203–4 **Contracts I–II** (4–2) Nash, Cibinic, Pock, Ginsburg

Legal remedies of contracting parties, including damages in contract and quasi-contract, specific performance, reformation, recission, remedies in tort; acts creating and terminating contractual rights, including offer and acceptance, mistake, problems of proof; function of consideration; conditions; assignments; third-party beneficiaries; effect of changed circumstances; protection of the client's interests upon breach or threat of breach by the other party. Emphasis on problems of analysis, draftsmanship, adversary method. (Examination) (Academic year—day and evening)

207 **Torts** (4) Merrifield, Seidelson, Park, Banzhaf, Schwartz, Sirulnik

Liability for harm to person or property. Intentional torts, negligence, nuisance, products liability, misrepresentation, defamation, and invasion of privacy; fault and other basis for shifting losses; causation; damages; effects of liability insurance; problems under Federal Tort Claims Act. (Examination) (Fall—day and evening)

211 **Property** (4) Starrs, Schiller, Brown, Reitze, Smalls

Basic concepts of personal property. Real property: historical background of the law of estates and conveyancing, types of estates, dower and curtesy, landlord and tenant relationship, concurrent estates, future interests at common law and after the Statute of Uses; introduction to modern conveyancing—the real estate contract, the deed, the recording system, methods of title assurance. (Examination) (Fall—evening; spring—day; summer 1975)

212 **Constitutional Law** (4) Miller, H. Green, Mayo, Barron, Park

Basic principles of American constitutionalism; judicial function in constitutional cases; implementation of doctrines of separation of powers, federalism, limited government; development and exercise of national powers; introduction to civil rights and liberties. (Examination) (Spring—day and evening; summer 1975)

215 **Criminal Law and Procedure** (4) Starrs, Allen, Robinson, Ferster, Sirulnik

Origin and purposes of criminal law; elements of criminal liability; mental disorders; crimes against the person, property, and against both; statutory offenses; criminal procedure, with consideration of Federal Rules of Criminal Procedure. (Examination) (Fall—day; spring—evening)

218 **Civil Procedure** (4) Sharpe, Schwartz, Park, Ferster, Kayton, Barron, Smalls

Mechanics of litigation—rules which govern the process by which rights and duties studied in substantive law courses are enforced; pleadings, discovery, pre- and post-trial motions, jurisdiction and venue, equity jurisdic-

tion and trial by jury, former adjudication. Emphasis on Federal Rules of Civil Procedure, but principles and main problems indigenous to all procedural systems are developed. (Examination) (Spring—day and evening)

220 **Legal Research, Writing, and Professional Responsibility and Ethics** (2) Seidelson and Staff

Introduction to and practical experience in the use of a law library; instruction and practice in legal writing, including a memorandum and appellate court brief; instruction and experience in the preparation and argument of an appellate court case; instruction in questions of professional responsibility and ethics. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. For credit, a student must attain a minimum grade of 65. (Fall—day and evening)

232 **Evidence** (4) Seidelson, Robinson, Albert, Park

Preparation and presentation of evidence, including proof of writings, qualification and examination of witnesses with emphasis on impeachment, privilege; opinion testimony; determination of relevancy; demonstrative, experimental, scientific evidence; application of the hearsay rule. (Examination). (Spring—day and evening; summer 1975)

ELECTIVE COURSES

302 Admiralty (2) Sharpe

American practice and jurisdiction in admiralty; saving clause actions at law. Substantive maritime law of title and possession, maritime liens, personal injury and wrongful death, charter parties and bills of lading, general average and salvage and marine insurance, collisions. Lawmaking methods: judge-made law, statutes, international commerical custom, and treaties. (Examination) (Fall—evening)

304 **United Nations Law and World Order** (2) Mallison

Introduction to international law through study of law and practice of United Nations Charter; structure and process of decision of United Nations; maintenance of international peace and security—peaceful settlement of disputes and national and collective self-defense; formulation and implementation of human rights. Complements but does not repeat the material in Law 305. (Examination) (Spring—day and evening)

305 **International Law and World Order** (3) Mallison

(Formerly two credits)

Traditional content of introductory course in international law presented in context of values and institutions of world community; emphasis upon national states as participants in decision-making processes with consideration also of individuals; analysis of range of available sanctions; roles and effects of international agreements under United States Constitution. Complements but does not repeat material in Law 304. (Examination) (Fall—day and evening)

307 **Comparative Law** (3) Albert, Liebesny

A general introduction to the world's main legal systems with emphasis on civil law. Comparative study of the administration of justice, procedural problems, and selected substantive legal institutions. (Examination) (Spring—day)

309 **Conflicts of Laws** (3) Seidelson, Pock, D. Green, Smalls

Legal problems arising from occurrences transcending state or national boundaries; jurisdiction; foreign judgments; constitutional influences; theoretical bases of choice of law principles and their application to specific fields, including torts, contracts, property, family law, administration of estates, business associations. The grade *CR* (credit) or *NC* (no credit) only is given in sections taught by D. Green. Green (Problem Assignments) Seidelson, Pock (Examination) (Fall—day; spring—day and evening; summer 1975)

311 **Agency and Partnerships** (2) Sharpe, Schiller

Employment relations, vicarious liability of employers for employees' torts, scope of employment, and independent contractors; agents' authority and apparent authority to contract for their principals, ratification; nonprofit associations; the formation, operation, and termination of partnerships; limited partnerships. (Examination) (Fall—day and evening; summer 1975)

312 **Corporations** (4) Kirkpatrick, H. Green, Stevenson

Corporate law, with emphasis on operations and financing of corporations. Control of corporations, action by corporate directors, officers, shareholders. Control devices. Directors' and shareholders' duties of care and loyalty, insiders' transactions in shares of the corporation. Derivative suits, kinds of shares, dividends, corporate distributions. (Examination) (Fall—day; spring—evening; summer 1975)

313 **Sales and Sales Financing** (2) Albert, Rothschild, Ginsburg

Provisions of the Uniform Commercial Code relating to sale and distribution of goods, including bulk transfers, warehouse receipts, bills of lading, and other documents of title; particular attention to secured transactions and financing devices utilized in this connection. (Examination) (Fall—day and evening)

314 **Commercial Paper, Check Collection, and Banking** (2) Albert, Rothschild, Schwartz, Ginsburg

Classic view of negotiable instruments as codified by Article III of the Uniform Commercial Code. Check collection: the system in theory as expressed in Article IV of the Uniform Commercial Code and the system in practice; Federal Reserve regulations, Clearing House agreements, and automation systems. The dual banking system, work of the Comptroller General and the Federal Reserve Board. Legal problems concerning interest and the checkless society. (Examination) (Spring—day and evening)

318 **Creditors' Rights** (3) Kirkpatrick

Creditors' remedies outside bankruptcy—compositions, agreements, general assignments; bankruptcy proceedings under the federal statute, administration, discharge, the position and powers of the trustee, preferences; corporate reorganization under Chapter X of the Bankruptcy Act. (Examination) (Fall—day and evening)

321–22 **Current Decisions** (2–2)

Limited to members of the student staff of the *Law Review*. A maximum of 4 semester hours of credit may be earned in this course. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Academic year—day and evening)

323 **Journal of International Law** (1 or 2)

Limited to editors of the student staff of the *Journal of International Law and Economics*. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring—as arranged)

325–26 **Trusts and Estates I–II** (3–3) Weaver, Kuhn

Noncommercial transfers of wealth at death or during life. Law 325: essential elements and formalities for creation of trusts and execution of wills, revocation and alteration, grounds for contest, limits on property owner's power to control, intestate succession. Law 326: dispositive provisions, common questions of construction, future interests problems, administration of estates and trusts, charitable trusts. Prerequisite to Law 325: Law 211; to Law 326: Law 325. (Examination and Problem Assignments) (Law 325: fall—day and evening; summer 1975. Law 326: spring—day and evening)

327 **Modern Real Estate Transactions** (2) Brown, Schiller

Advanced problems in purchase and sale of real estate: legal responsibilities and functions of buyer, seller, broker, escrow agent, conveyancing attorney, title examiner, abstractor, insuror of title; process of examination and assurance of title and other interests in realty, including recording, registration and title insurance systems, settlements and closings, warranties, hazard insurance; emerging problems related to cooperatives, condominiums and property-owners' associations; problems related to compliance with subdivision, zoning, building and housing code regulations. (Examination) (Spring—day)

329 **Unfair Trade Practices** (3) Weston, Harris, Banzhaf

Unfair trade practices at common law and under statutes; trademarks, trade names; copyright law; misappropriation of ideas; protection of competitors and consumers against false advertising under Federal Trade Commission Act; resale price maintenance under state Fair Trade Acts, state sales-below-cost statutes; Robinson-Patman Price Discrimination Act; miscellaneous business practices. (Examination) (Fall—day; spring—evening)

330 **Federal Antitrust Laws** (3) Weston, Kirkpatrick

Sherman and Clayton Acts, related statutes. Price-fixing agreements and other types of trade restraints considered under Section 1; monopolizing considered under Section 2 of the Sherman Act. Mergers and tie-in sales other activities under the Clayton Act. All types of business conduct raising questions under the antitrust laws, including trade association activities, exclusive-dealing arrangements, boycotts, patents and copyrights. (Examination) (Fall—evening; spring—day)

331 **Product Liability** (2) Schwartz

Development of the concept of product liability and consumer's remedies. Specific problems and processes in evaluation of risk and benefit encountered in government regulation of dangerous and defective products. Survey of civil actions for harm resulting from defective and dangerous products with reference to parties and proof in negligence, warranty, nuisance, fraud, misrepresentation, and other cases. Problems associated with hazard identification, insurance, and industry self-regulation. Review of Consumer Product Safety Act and current legislation dealing with injuries and remedies in specific areas. (Examination) (Fall—day)

332 **Federal Jurisdiction** (2) Sharpe, Schwartz, Albert, D. Green, Barron, Smalls

Relationship of federal courts to Congress and to the states, through analysis of cases dealing with federal judicial functions (including problems of advisory opinions, standing to litigate, justiciability), federal questions in federal courts, federal review of state court decisions (including relation between state and federal substantive law, procedural problems in exercising review, application of law to fact). The grade *CR* (credit) or *NC* (no credit) only is given in sections taught by D. Green. Sharpe, Albert—(Examination); Green—(Problem Assignments) (Fall—day and evening; summer 1975)

334 **Advanced Criminal Procedure** (2) Starrs, Robinson, Ferster

Decision to arrest, prosecutive discretion, bail, the preliminary hearing, right to a speedy trial, discovery, plea bargaining, publicity, post-conviction procedures. Starrs—(Examination and Problem Assignments); Robinson, Ferster—(Examination) (Fall—day and evening)

335 **Jurisprudence** (2) Mayo, Kramer

Basic jurisprudential concepts; nature of law; development of legal institutions; jurisprudential schools—natural law, analytical, historical, sociological, functional; law and logic; law and justice; the judicial process; legislative, executive, administrative decision-making; impact of politics, economics, and scientific advance on legal systems; contemporary trends in jurisprudential thought. Mayo—(Examination); Kramer—(Writing Assignments) (Fall—evening; spring—day)

336 **Taxation—Federal Income** (3) Weaver, Hambrick, Speiller

Survey of substantive provisions of federal income tax law, including concept of gross income, provisions affecting taxation of family and individual transactions, limitations on allowable deductions, sales and dispositions of property, problems of capital gains taxation, nontaxable exchanges. Weaver—(Examination and Problem Assignments); Hambrick—(Examination) (Fall—day and evening; summer 1975)

338 **Taxation—Federal Estate and Gift** (2) Kramer, Hambrick

Survey of substantive provisions of federal estate and gift tax laws, including inter vivos transfers, transfers in contemplation of death, joint interests, life insurance proceeds, property subject to powers of appointment, marital deduction and split gifts; tax procedure. (Examination) (Fall—day and evening)

339 **Collective Bargaining and Labor Arbitration** (3) Merrifield, Rothschild

Collective labor agreement: content, negotiation, administration through grievance procedure and arbitration; problems in settlement of labor disputes. Prerequisite: Law 341 Merrifield—(Examination and Problem Assignments); Rothschild — (Problem Assignments) (Spring — day and evening)

340 **Taxation—Federal Income, Corporations and Shareholders** (3) Hambrick, Tannenwald, Tucker, Osteen

Continuation of Law 336. Primary emphasis on corporate-shareholder relationships. Problems of corporate dividends, redemptions of stock, distributions in partial and complete liquidation, stock dividends, bail-outs, and dividends in kind closely analyzed. Federal income tax problems involved in the formation of corporations, the sale of corporate businesses

(including collapsible corporations), mergers and acquisitions, and corporate divisions. Students who have received credit for former Law 3 cannot receive credit for Law 340. Prerequisite: Law 336. (Examination) (Fall—evening; spring—day)

341 **Labor Law** (3) Merrifield, Albert, Rothschild

Law governing labor-management relations, organizations and representation of employees, regulation of economic weapons, enforcement of collective bargaining agreements, interunion and intra-union relations. (Examination) (Fall—day and evening; summer 1975)

342 **Moot Court** (1 or 2) Staff

Limited to the winners of the upperclass competition in the fall and the first-year competition winners in the spring. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring)

343 **Law Students Civil Rights Research Council (LSCRRC)** (1 or 2) Kuhn

Clinical problems concerned with the legal problems of minorities, women, and the poor. Students work with organizations such as the Lawyers Committee for Civil Rights Under Law, Women's Legal Defense Fund, Civil Rights Division of the Justice Department, Institute for the Development of Indian Law, National Committee Against Discrimination in Housing, and National Senior Citizens Law Center. Approximately 60 hours of work per semester is required for each credit hour. (Fall, spring, summer—as arranged)

344 **Legal Writing** (1 or 2) Staff

Preparation of a research paper under the supervision of a full-time member of the Faculty who will determine, prior to registration, whether the work required for the topic selected justifies one or two semester hours of credit. If elected for one hour of credit, this course may be repeated to meet the legal writing requirement for the degree. Approval of the faculty member is required prior to registration. (Research Paper) (Fall and spring—as arranged; summer 1975)

345 **Students-in-Court** (4) Staff

Open only to third-year law students. In the D.C. Law Students in Court Program, students represent indigent litigents in the Small Claims, Landlord-Tenant, and Criminal (misdemeanors) division of the D.C. Superior Court. Their duties include client interviews, investigation, settlement negotiations, preparation and argument of motions, and conduct of trials. Students are required to spend one day in court and attend seminars each week (Wednesday or Thursday evening at the student's option in the civil program; Monday evening and Saturday morning in the criminal program). Some seminars will be held off campus. Application must be made during the spring semester of the preceding academic year; preference will be given to students with a cumulative-grade average above 75; however, consideration is given to past participation in clinical or extracurricular activities or employment which provides background for litigation and working with indigents. Students may participate during the summer, during the full academic year, or during the summer plus one other semester. This course may not be taken at the same time as Law 487, 579, or any litigating activities in Law 346. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring—as arranged; summer 1975)

346 **Legal Aid (arr.)** **Staff**

Work done in connection with the Legal Aid Bureau under the supervision of the faculty adviser, who will determine, prior to registration, the number of semester hours of credit the work required will justify and whether the student has all prerequisites. Any litigating activities of this course may not be taken at the same time as Law 345, 487, or 579. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring—as arranged)

347 **Insurance (2)** **Schiller, Pock**

A primary risk distributing medium and the rules by which legislative, administrative, judicial bodies seek to promote its benefits and avert its dangers. Includes insurance marketing, insurable interest, subrogation, transfer of insurance benefits to nonpolicyholders, coverage and other insurance policy provisions, disposition of claims. (Examination) (Fall—day and evening; summer 1975)

348 **Domestic Relations** (2) Potts, Ferster, Kayton

Marriage, annulment, and divorce; adoption and custody of children; economic relations. (Examination, Research Paper, and extensive interdisciplinary readings) (Fall—day and evening; spring—day)

349 **Local Government Law** (2) Pinsky, Washington, Danzansky

Decision-making processes in metropolitan and local communities; types and objectives of city, county, special-function local government units; intergovernmental relations; original organization and changes; personnel; local lawmaking; responsibility in tort; introduction to community planning. (Examination) (Fall and spring—evening)

351 **Law and Accounting** (2) Cibinic, Ginsburg

Study of fundamental accounting principles with emphasis on corporation accounting; legal and accounting implications of specific items in financial statements of corporations; inventory adjustments; corporate transactions, distributions, capital adjustments. Strongly recommended for students who have had no accounting. (Examination and Problem Assignments) (Fall—day and evening)

355 **Government Contracts** (3) Nash, Cibinic

Survey of basic law underlying government procurement, basic power and limitations on federal government in entering into contracts, administrative and legislative policies governing these contracts, advertised and negotiated procurement procedures, forms of contracts and clauses used. Law 431 *Government Procurement Law* is the substantial equivalent of this course. (Examination and Problem Assignments) (Spring—day)

359 **Patent Law (3)** **Kayton, Harris**

Law of patents subsequent to issuance of patent; nature of patent as property and as a legal instrument; validity—novelty, nonobviousness, commercial success; infringement—direct and contributory, doctrine of equivalents and file-wrapper estoppel. Substantive concepts introduced in an order approximating patentee's and infringer's cases in litigation. Designed for students intending to specialize in patent law; knowledge or experience in patent law helpful but not prerequisite. (Examination) (Fall—evening; spring—day)

362 Patent Office Practice (2) Kayton, Harris

Substantive and procedural law of patents leading to issuance of patent, mainly related to proceedings before U.S. Patent Office. Obtaining and preserving earliest possible patent filing date; continuing applications, res judicata, novelty and nonobviousness requirements; substantive rules of priority of invention and related affidavit practice; nature of claims and formal defects; restriction and double patenting. Designed for students intending to specialize in patent law. Prerequisite: Law 359. (Examination) (Spring—evening)

372 **Administrative Law** (3) Miller, Park, Banzhaf, Barron

Study of the administrative process in executive and independent regulatory agencies; emphasis on judicial review. Formal and informal decision-making, investigation, planning, and public administration functions of the agencies as related to their legal limits and to the roles of lawyers in government and private practice. Relationships of agencies to the executive and legislative branches, to public and private interest groups, and to the social, political, and economic aspects of various philosophies of government regulation. Miller—(Research Paper); Park—(Examination and Writing Assignments); Banzhaf—(Examination) (Fall—day and evening; spring—day; summer 1975)

375 **Remedies** (3) Cibinic, Ginsburg, D. Green, Smalls

Development and use of judicial remedies that give relief for past or threatened injuries to interests of personalty and property. Remedial approaches include compensatory and punitive damages, injunctions, unjust enrichment, constructive trusts, equitable liens, tracing, subrogation, and specific reparation. Emphasis on comparing remedial options in fraud, mistake, duress, breach of contract, and abuse of fiduciary relationships. The grade *CR* (credit) or *NC* (no credit) only is given in sections taught by D. Green. Cibinic, Ginsburg—(Examination); Green—(Problem Assignments) (Spring—day and evening)

377 Legislation (2) Fenster

Legislative process and roles of participants in the process; operation of United States Congress and state legislatures, including fact finding, organization, procedure. Statutory interpretation emphasized to provide foundation for more advanced courses. (Examination) (Spring—day)

380 Environmental Law (3) Reitze

Government control of environmental pollution; the National Environmental Policy Act; solid waste management; noise, water, and air pollution control; and common law remedies. (Examination) (Spring—day)

381 Environmental Planning (3) Reitze

Survey of the law of environmental planning, including selected topics of land use planning, mining, forestry, energy, transportation, public land law, and ocean protection. (Examination) (Fall—day)

385 **Trial Practice Court** (2) Jackson, Ryan, Kendrick, Skinker, Stevas, Altshuler, Nunzio, McArdle, Seidel

Trial of assigned cases, trial tactics and techniques, pre-trial and courtroom procedures pursuant to federal rules. Students may repeat this course once for credit. Prerequisite: forty-two semester hours, including

Law 218. Prerequisite or concurrent registration: Law 232. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and Spring—day and evening)

389 **Medicine for Lawyers** (2) **Hirsh**

Survey of the basic medical sciences and the rudiments of clinical medicine as encountered in the practice of law. Medical terminology, the disease process, trauma, and industrial medicine. The application of this fundamental information is demonstrated in personal injury or negligence and malpractice litigation as well as in commitment and equitable proceedings. Students may witness autopsies at the D.C. Medical Examiner's Office, surgery at George Washington University Hospital, and medical rounds at D.C. General Hospital. Emphasis on enabling the lawyer to communicate most effectively with medical specialists. (Examination) (Fall—day)

390 **Forensic Medicine** (2) Sharpe, Fiscina, Head

Malpractice, insurance, and alternatives to professional liability litigation; securing and presenting medical evidence to prove causation and damages; chemical test data and behavioral science findings in court; entry into and practice of the professions; professional organizations; hospitals; professional service delivery; public policy intervention in medical science—for example, abortion, transplantation, and coerced treatment. (Examination) (Fall—day and evening)

394 **Women and the Law** (2) Wolf, Dorian

An examination of the treatment of women in all areas of the law and of legal remedies for sex discrimination. Emphasis on constitutional law, criminal law, discrimination in the media, education, and employment. Students choose clinical projects or research papers on which to focus the semester's work. Enrollment limited to 30 students. (Research Paper) (Fall and spring—evening)

395 **Public Strategies in Tax Policy and Tax Reform** (2) Brandon

Study of the formulation of tax legislation and administrative tax policy. Emphasis on the development of legal strategies to reform the present tax structure and its administration. Classic reform arguments, new approaches, and present legislative activity studied from the point of view of citizen action, lobbying, and other strategies to influence pending decisions. Open to a limited number of third-year students. Final grade based on class participation and a written project formulating reform strategy to deal with specific problems selected by the student. (Writing Assignment) (Spring—evening)

396 **Legal Activism** (3) **Banzhaf**

Study of the use of law and the legal process, not as a technique for resolving disputes between identified individuals and/or organizations, but as a powerful tool for ameliorating problems of general public interest. Principles and techniques of legal activism, maximum effectiveness of public interest actions, how these actions differ from conventional legal practice. To learn these techniques effectively, and to test and develop their proficiency in their use, students will form clinical project groups and initiate or participate in a legal or law-related activity directed against a public interest problem of their own choosing. (Fall—day)

399 Clinical Law Work (arr.) Staff

Projects involving litigation, research, or public interest activities of a legal nature (including aid to indigents, support of public interest non-profit corporations, and support of governmental agencies or courts) may be initiated and will be supervised by a faculty member. Projects must be approved in advance by the Law Center Supervisory Committee (three members) both as to whether the project is appropriate and as to the number of semester hours of credit to be granted. A maximum of 10 semester hours of credit may be taken in one or two semesters. This course is open to a limited number of third-year law students. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring)

ADVANCED COURSES

ADMINISTRATIVE LAW: ECONOMIC REGULATION

Faculty Advisers: A.S. Miller, R.E. Park, G.E. Weston

402 Executive Function (2) Miller

Executive branch in constitutional theory; major trends in development of executive-administrative function; organization of executive branch; relationship of executive to Congress and judiciary; policy-making procedures within executive branch including role of Bureau of the Budget in national policy planning; case studies in exercise of executive power in such functional areas as national defense, race relations, national economy, foreign economic relations; role of law and lawyers in executive decisional and implemental process. (Research Paper)

404 Securities Regulation (2) H. Green, M. Cohen, Mathews, Michaely

State and federal laws governing offering and distribution of securities to the public by corporate issuers and others, regulation of securities markets, rights and liabilities of purchasers under such statutes. Emphasis on statutes administered by Securities and Exchange Commission. (Take-home Examination) (Fall—evening; spring—day)

405 Regulation of Securities Markets (2) Rotberg, Eisenberg

Operation of over-the-counter and exchange markets, including competitive and monopolistic practices in each market; relationship of antitrust laws and securities regulations to concept of a free and open market place; role of regional exchanges and third market in providing competitive element in market; advantages and disadvantages of a fragmented market; minimum fee structure, rebates and their effect on merchandising of securities and financial soundness of industry; use and availability of economic data in evaluating performance of market place. The seminar will examine matters directly of interest to graduate law students, lawyers, economists, and political scientists. (Take-home Examination) (Spring—evening)

412 Food and Drug Law (2) Kaplan, Becker

The Federal Food, Drug, and Cosmetic Act, and related laws. Consumer, government, and industry viewpoints. (Choice of Paper or Examination) (Spring—evening)

413 **Public Policy and Mass Media** (2) Barron, Cohn

Institutional structure of mass media and their interrelationships; psychological aspects of mass communications; continuing adjustments among public interest goals, the economic system, and technological developments; influence of and controls exercised by government, other institutions, and private groups; conflict between freedom of speech of the media and other major community interests; the media's relationships to the interests of dissident and minority groups and the access of these groups to the media. Barron—(Examination or Research Paper); Cohn—(Research Paper) (Fall—day; spring—evening)

414 **Regulated Industries** (2) **Park**

Substantive problems of business regulation in terms of natural monopolies, licensed industries, subsidized industries, and safety regulation. Typical problems raised include the role of intervenors, the impact of regulation upon management and market behavior, the uses and abuses of economic evidence, the role of agencies' staffs, interagency planning and regulation, and the effects of judicial and legislative review. Each student selects one industry and develops his insight into economic regulation in terms of that industry's firms, market structure, growth and development, trade associations, and regulatory agencies. (Research Paper) (Spring—day)

417 **Seminar: Trade Regulation** (2) Weston, Harris

Group study of current problems relating to unfair trade practices and federal antitrust laws. (Research Paper) (Fall—evening)

Master of Laws candidates in the area of Administrative Law: Economic Regulation who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

329 *Unfair Trade Practices*
330 *Federal Antitrust Laws*
372 *Administrative Law*

OTHER RELATED COURSES

451 *Federal Poverty Legislation*
493 *Intergovernmental Aspects of Technological Change*
494 *Use and Control of Nuclear Energy*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*
571 *Land Development Planning*
594 *Seminar: Privacy*

CORPORATION LAW

Faculty *Advisers:* H.P. Green, R.B. Stevenson, Jr.

422 **The Modern Corporation** (2) **Miller**

Analysis of the nature and role of the large business corporation in the American political economy; models of the corporation; the transnational

or multinational enterprise; the concept of accountability as applied to corporate activities; reasons for the growth of large corporate enterprise; relationships of the "supercorporations" to other centers of decentralized power and to the government; the corporation as the basic planning unit of the American economy; application of the Constitution to the corporation. (Research Paper)

424 **Business Planning** (2) H. Green, Stevenson, Flyer, Lewis, Berkeley

Integrated study of corporate, financial, tax, accounting, and SEC aspects of the following: organization of a small corporation; organization of a public corporation; stock dividends, recapitalization, and stock repurchases in the context of conflict between active stockholders of a close corporation and the family of a deceased active stockholder, corporate liquidations; corporate mergers and acquisitions; and divisions of corporations. Prerequisite: Law 312, 336, and 340. Enrollment may be limited by the professor. (Problem Assignments) (Fall and spring—day and evening)

427 **Legal Aspects of International Business Transactions** (2) Nurick, Stevenson

U.S. law and practice, including current tax problems and U.S. restrictions on investment; brief comparison with British and civil law systems; international law, international contracts, choice of law; currency considerations; effect of SEC laws and regulations; international trade, including GATT and reciprocal trade arrangements; sources of finance, both United States and foreign, private and public, including international organizations; protection of property, settlement of disputes, and selected case studies. In addition to the regular lecturers, there will be guest lecturers in various specialties. Emphasis on current problems in international trade and investment. (Choice of Research Paper or Examination) (Spring—day and evening)

Master of Laws candidates in the area of Corporation Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

312 *Corporations*
313 *Sales and Sales Financing*
329 *Unfair Trade Practices*
330 *Federal Antitrust Laws*
340 *Taxation—Federal Income, Corporations and Shareholders*

OTHER RELATED COURSES

331 *Product Liability*
417 *Seminar: Trade Regulation*
431 *Government Procurement Law*
525 *Copyright Law*
526 *U.S. Trademark Law: Selection, Use, Registration, Protection, and Franchising of Trademarks*
540 *Choice of Law and Forum in Transnational Contracts, Techniques of Conflict Avoidance*
541 *Seminar: European Common Market*
555 *Taxation—Special Corporation Problems*
562 *Income Taxation of Foreign Business and Investment*

GOVERNMENT PROCUREMENT LAW

Faculty Advisers: J. Cibinic, Jr., G.J. Ginsburg, R.C. Nash, Jr.

431 **Government Procurement Law** (3) Nash, Cibinic

Survey of the law pertaining to government procurement, including an analysis of the unique features of government contracting and a discussion of the functions of Congress, the executive branch, and the courts in the procurement process. Law 355 *Government Contracts* is the substantial equivalent of this course. (Examination) (Fall—evening)

433 **Performance of Government Contracts** (3) Nash, Cibinic

Discussion of the substantive legal problems that most frequently arise during the performance of government contracts. Interpretation of specifications and the most generally used contract clauses, and analysis of the rights of the parties when performance in accordance with the terms of the contract is not obtained. (Examination and Problem Assignments) (Fall—evening)

434 **Government Contract Claims and Litigation** (2) Nash, Ginsburg

Analysis of the methods which can be used by the parties to a government contract to obtain legal relief, including detailed coverage of the disputes procedure, actions for breach of contract, and forms of equitable and extraordinary relief. (Examination and Problem Assignments) (Spring—evening)

435 **Seminar: Government Contracts** (2) Nash, Cibinic, Ginsburg

Research and discussion of selected problem areas. (Research Paper) (Spring—day)

OTHER RELATED COURSES

402 *Executive Function*
424 *Business Planning*
427 *Legal Aspects of International Business Transactions*
442 *Labor Standards*
494 *Use and Control of Nuclear Energy*
495 *Legal Protection against Technological Hazards*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*
535 *Negotiation: Concepts and Techniques*

LABOR LAW

Faculty Advisers: J.M. Albert, L.S. Merrifield, D.P. Rothschild

441 **Seminar: Disability Problems** (2) Doherty

Workman's compensation law, extension of no-fault principle into motor vehicle area, and national health problems. (Examination) (Fall—evening)

442 **Labor Standards** (2) Ginsburg

Analysis of the Fair Labor Standards Act, its scope and exemptions, the Civil Rights Act and other labor statutes; the laws establishing labor standards for government contracts, including the Davis-Bacon Act,

Walsh-Healey Act, Service Contract Act, and Work Hours Act; the role of the Department of Labor, the Comptroller General, and the contracting agencies in interpretation, administration, and enforcement of these statutes. (Examination) (Spring—evening)

443 **Labor Relations in the Federal Service** (2) Tobias

Survey of labor relations in the federal service as governed by Executive Order 11491. Emphasis on the role of the Civil Service Commission, the Department of Labor, the Congress, and the President in the development of collective bargaining relationships between unions and the federal government. (Research Paper) (Fall—evening)

444 **The Individual and His Union** (2) Gold

Study of the legal relations between unions and their members with special emphasis on the right to fair representation, the right to union membership, compulsory union membership, the imposition of discipline upon union members, reporting requirements, the conduct of internal union elections, the fiduciary duties of union officers, the imposition of trusteeships, the regulation of racketeering, and political action of unions. Prerequisite: Law 341. (Examination) (Summer 1975)

445 **Labor Relations in State and Local Governments** (2) Jascourt

Analysis of the shifting and emerging legal concepts that affect the form, scope, and consequences of labor relations in schools and colleges and in municipal, county, and state governmental bodies. Survey of the varied statutory and de facto labor relations systems and their impact on the development of bilateral decision-making. Examination of (1) problems caused by the concurrent existence of civil service laws and the diffusion of governmental authority, (2) impasse resolution, and (3) strikes and other concerted activities. (Problem Assignments) (Spring—evening)

446 **Equal Employment Opportunity** (2) Staff

This course covers the spectrum of federal laws and executive orders relating to all types of discrimination in employment, including Title VII of the Civil Rights Act of 1964, as amended by the Equal Employment Opportunity Act of 1972; the Equal Pay Act of 1963, as amended in 1972; the Age Discrimination in Employment Act; the Civil Rights Act of 1866; the Fourteenth Amendment; the National Labor Relations Act; Executive Orders 11246 and 11375 relating to government contractors (including the "Philadelphia Plan" and other government-imposed "affirmative action" plans and bid conditions, and Revised Order No. 4 relating to sex discrimination). The course includes the substantive and procedural rights available to employees of firms doing business with the government, as well as those of other private firms and state and local government agencies subject to the above federal legislation. (Examination) (Fall—evening)

447 **Seminar: Labor Law** (2) Merrifield, Chanin

Group study of contemporary problems in labor law. (Research Paper) (Spring—day and evening)

449–50 **Seminar: Labor Litigation** (1–1) Gold

Intensive study of recent Supreme Court and appellate court decisions in the area of labor law; special emphasis on the contrasting variables which influence the respective decision-making processes of the National Labor Relations Board and the courts. Particular attention to labor law cases

pending before the Supreme Court for decision during the current term. Analyses of the briefs filed in pending cases; attendance at oral argument; post mortems of the arguments and decisions, with classroom participation by attorneys involved in some cases. Grades and credit for both halves of the course assigned only on completion of the second half. Enrollment may be limited. Admission by permission of instructor. Prerequisite: Law 341. (Research Paper) (Academic year: every other week—evening)

Master of Laws candidates in the area of Labor Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

339 *Collective Bargaining and Labor Arbitration*
341 *Labor Law*

OTHER RELATED COURSES

459 *Problems of the Consumer*
460 *Current Problems in Civil Rights*

LAW AND POVERTY

Faculty Advisers: R.S. Kuhn, D.P. Rothschild, J.E. Starrs

451 **Federal Poverty Legislation** (2) Mirel
(Formerly Federal Programs in Urban Poverty)
Students are given a chance to observe at first hand the problems inherent in implementing a federal policy to alleviate poverty through legislation. Students are assigned to work with individual poverty agencies in the District of Columbia on matters relating to the federal funding agencies. Discussions focus on various aspects of poverty law problems as lawyers deal with them—from conception of the legislative program, to Congressional debate, to administrative policies, to fund distribution, to litigation. (Research Paper) (Fall—day)

458 **Housing the Poor** (2) Starrs
An in-depth analysis of current housing problems, including three main subjects: (1) Discrimination in housing. (2) Landlord and tenant relationship, including a discussion of leases and their clauses and of the eviction process, tactical and substantive defenses to it, and affirmative avenues of redress on behalf of the tenant; public housing and building code enforcement. (3) Home ownership by the poor, including its financing by instruments such as the deed of trust and the installment land contract as well as federal subsidy programs. Admission by permission of instructor. (Research Paper)

459 **Problems of the Consumer** (2 or 3) Rothschild
Clinical treatment of consumer protection. Minimum of 8 hours work commitment each week required; 2-hour weekly class required in addition for 3 credits. Students purchase consumer protection materials and Text, and are divided into projects groups. For example, the National Law Center has negotiated with a commercial TV station to put on a series of news spots dramatizing consumer problems and will also run a "Consumer Help Center." This activity will involve three groups: (1) a group to work with the station on programming, (2) a group to run the Con-

sumer Help Center, and (3) a research group to investigate the result of complaint intake, referral, and disposition. Other students will work in inner-city store-fronts, with county government agencies, and on the editorial staff of the *Consumer Protection Reporting Service*. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring—day; summer 1975)

460 **Current Problems in Civil Rights** (2) Kuhn, Silard

Uses of law in the effort to achieve racial equality, in areas such as (1) discrimination against minority groups and the poor in land use and zoning, (2) school desegregation, and (3) employment discrimination. The class is divided into groups, each dealing with a problem situation in one of these areas. Students represent fictitious clients, write briefs, and argue in class before a student panel of judges, which then writes an opinion. Grades are based on these written and oral presentations, plus brief critiques of other groups' presentations. Enrollment limited by the instructor. (Problem Assignments) (Spring—day)

OTHER RELATED COURSES

441 *Seminar: Disability Problems*
472 *Administration of Criminal Justice*
475 *Law and Criminology I: Search for the Causes of Criminal Behavior*
476 *Law and Criminology II: Society's Responses to the Criminal Offender*
477 *The Police and the Community*
560 *Taxation—State and Local*
571 *Land Development Planning*
575 *Community Economic Development*
590 *Population Control and the Law*
592 *Seminar: Constitutional Law*

LAW, PSYCHIATRY, AND CRIMINOLOGY

Faculty Advisers: R.C. Allen, T.F. Courtless, Jr., E. Ferster

Allen

472 **Administration of Criminal Justice** (2)

Consideration and analysis of selected advanced problems in the administration of criminal justice. The subject matter covered will vary from year to year, with concentration in areas of current interest and dynamic change (e.g., right to counsel, arrest and interrogation, search and seizure, prejudicial publicity, discovery, electronic interception, mental impairment). Emphasis will be placed on the role and professional responsibilities of prosecutor and defense counsel and on developmental trends in the law. (Research Paper or Examination)

Starr

473 **The Crime Lab, the Forensic Scientist, and the Criminal Lawyer** (2)

Designed to acquaint the student with the operations of a modern crime laboratory and the courtroom acceptability of testimony of forensic scientists and other evidence on laboratory test results. Identification of individuals (fingerprints, palmprints, footprints, voiceprints, anthropologic reconstruction, hair identification, and serology), identification of objects (ballistics, handwriting, typewriting, fiber identification, paints, varnishes, glass, wood, and paper), toxicology, pathology, forensic use of the m

croscope and the camera, the coroner and the medical examiner systems, and drug law enforcement. Visual aids, crime laboratory guest lecturers, and field trips to crime laboratories. (Research Paper) (Spring—day)

475 **Law and Criminology I: Search for the Causes of Criminal Behavior** (2) Courtless

Role which criminological knowledge of crime causation may play in assisting lawyers to appraise the effectiveness of various alternative social and legal devices in controlling deviant behavior. The search for factors related to criminal behavior will be developed historically, with emphasis on current causal theories developed by various disciplines. Model as well as operational penal codes, sentencing and probation practices, and specialized facilities will be analyzed in terms of their relationship to such causal theories. (Research Paper) (Fall—day)

476 **Law and Criminology II: Society's Responses to the Criminal Offender** (2) Courtless

Study of the development and current use of society's three maior approaches to the handling of offenders: punitive, mechanical, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior, and research findings concerning effectiveness of these responses. Analysis of treatment strategies to facilitate communication between members of the legal profession and behavior scientists charged with effectuating these strategies. Prerequisite: Law 475. (Research Paper) (Spring—day)

477 **The Police and the Community** (2) Allen, Courtless

Problems and potential of contemporary urban law enforcement: the role and perspective of the police officer; the police *qua* organization; "styles" of law enforcement; law enforcement in the inner city; relationship with ethnic minorities; civil disorder; police-community relations; methods in arrest and investigation; complaint review procedures; science and technology in law enforcement; police handling of juveniles; crime and crime statistics. (Problem Assignments)

478 **Post-conviction Dispositions** (2) Axilbund

Study of the practice, problems, and alternatives facing a defendant, and discussion of the goals and standards for the criminal justice system. Enrollment limited to 25 students. Students who receive credit for Law 478 cannot receive credit for Law 480. (Examination) (Spring—day)

479 **Seminar: Criminal Practice** (2) Foster, Weisberg

Tactical and practical applications of criminal law; mastery of techniques in trying criminal cases. Class sessions built around mock problems based on actual criminal cases; student role-playing as defense attorneys and prosecutors. All phases of criminal trial work covered—client relations, investigation, discovery, trial preparation; particular emphasis on courtroom techniques—direct and cross examination, impeachment, refreshing recollection, laying foundations for exhibits, argument, and courtroom demeanor. Though many of the mock problems are written from a defense viewpoint, techniques taught are relevant to both prosecution and defense. Enrollment limited to 15 third-year and graduate students. Prerequisite: Law 334. Students may elect to receive either a numerical grade or the grade *CR* (credit) or *NC* (no credit). (Fall and spring—evening)

480 **Law of Criminal Corrections** (2) Cripe

(Formerly Dynamics of the Law of Criminal Corrections)

Study of two principal areas: (1) sentencing procedures, including probation, parole, and imprisonment; (2) legal rights of prisoners. Enrollment limited to 25 students. Students who receive credit for Law 480 cannot receive credit for Law 478. (Examination) (Fall—evening)

485 **Seminar: Health Care Delivery Systems** (2) Sharpe, Cotton

Study of the role of the lawyer in existing and proposed national systems for delivering health care. Students will gain familiarity with the concepts and terms in health care delivery by working with issues in the design, finance, and administration of existing arrangements; examination of the means of reconciling the expectations of various groups of health care service consumers and providers. (Research Paper) (Spring—day)

486 **Seminar: Law and Psychiatry** (2) Allen, Silverberg

Designed to expose the lawyer to basic constructs of psychiatry and psychology and to explore their implications in legal rules and practice. Psychiatrists and psychologists actively involved in teaching process. Topics include psychological testing and other assessment techniques, psychiatric evaluations and reports, child custody and other family law issues, privilege and confidentiality, competency in civil and criminal contexts, criminal law matters (including criminal responsibility and dispositional issues), civil commitment, right to treatment, right to refuse treatment, experimental procedures, and informed consent. Problems of counseling, legal ethics, preparation for trial, direct and cross examination, and other aspects of practice considered. There is ordinarily at least one session in a mental institution. (Take-home Examination or Research Paper) (Fall—day)

487 **Child Advocacy** (4) Ferster

Clinical program in juvenile law. Enrollment limited to 10 third-year students or Master of Laws candidates. Admission by permission of instructor. Students are required to spend one day in court and attend seminars each week. This course may not be taken at the same time as Law 345, 579, or any litigating activities in Law 346. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Problem Assignments) (Fall and spring—day)

OTHER RELATED COURSES

390 *Forensic Medicine*
591 *Legislative Drafting*
592 *Seminar: Constitutional Law*

LAW, SCIENCE, AND TECHNOLOGY

Faculty Adviser: H.P. Green

491 **Science Policy Formulation** (2) Staff

Recent and forthcoming important governmental decisions in science and technology; the role of law as a science policy implement; law in the decision-making process; risk-benefit decisions by Congress, the administrative process and the courts; bringing health, safety, environment, and aesthetics into technology assessment. (Research Paper)

492 **Seminar: Science and the Legal Process** (2) H. Green

Reciprocal relationships between law and science; absorption of scientific concepts into substantive law through adjudication, legislation, and rule-making; techniques and procedures used in handling, developing, and deciding scientific issues. (Research Paper) (Fall—evening)

493 **Intergovernmental Aspects of Technological Change** (2)

Role of technology in breaking down political barriers and leading to intergovernmental measures to control or advance technological progress within the United States and on an international basis. Specific legal devices and institutions employed in intergovernmental handling of technological problems. (Research Paper)

494 **Use and Control of Nuclear Energy** (2) H. Green, Malsch

(Formerly Use and Control of Atomic Energy and Space Technology)

Development of law and legal institutions to deal with revolutionary scientific developments in nuclear energy. Laws and regulations concerning peaceful uses of nuclear energy, including licensing, safety, environmental, security, and antitrust considerations.

495 **Legal Protection against Technological Hazards** (2) Dembling, Brown

The growth and development of law and legal institutions to protect society against the hazards inherent in new technologies with particular emphasis on the progress of reconciling the protection of the public with the deaire for rapid progress. (Research Paper)

OTHER RELATED COURSES

380 *Environmental Law*
381 *Environmental Planning*
402 *Executive Function*
412 *Food and Drug Law*
413 *Public Policy and Mass Media*
431 *Government Procurement Law*
505 *Intergovernmental Relations I*
531 *International Law of Air and Space*
532 *International Law of the Sea*

LAND USE MANAGEMENT AND CONTROL

Faculty Advisers: J.M. Brown, L.A. Schiller

501 **Land Development Law** (3) Brown

Study of the basic public and private means used by society to manage and control land use, such as zoning, subdivision regulation, pending codes, eminent domain, and privately contracted conditions, covenants, and restrictions. Identification and analysis of emerging new land control processes and the roles played by public and private entities involved in or affected by land use management and control efforts at the various echelons of government. Students participate in a game-simulation process representing a specific complex situation in land use conflicts involving their inherent technological, social, economic, political, and legal elements.

In the model situation students will assume roles as attorneys and work with assigned "clients." (Client-oriented written work and class participation) Enrollment limited by the instructor. (Fall—day; summer 1975)

502 **Water Resources Law** (2) **Hedeman**

Introductory survey course in the law relating to water resources. History and development of water rights systems in the United States using a comparative analysis of Eastern and Western water law doctrines, the trends toward their modification, and study of the increasing influence of federal laws and projects. Identification of federal-state-local relationships, conflicts, and institutions; consideration of river-basin management and interbasin transfers; description of proposed creation of new sources. (Examination) (Fall—evening; summer 1975)

504 **Seminar: Current Problems in Land Use Controls** (2) **Brown, Schiller**

New and emerging concepts of regionalism considered in the light of actual problem situations and attempts being made by various echelons of government to provide effective and equitable land use management and control. Examination of actual problem areas of major concern, including constitutional, administrative, political, judicial, social, economic, and technological elements. Functional planning and decision-making with respect to selected problem areas and their strategical and tactical transactions examined within the compass of the broader policy considerations involved. Guest lecturers; clinical exposure to various government agencies responsible for cooperating with the selected problems. (Research Paper) (Spring—day)

505 **Intergovernmental Relations I** (2) **Nash**

Study of federalism, emphasizing current techniques for achieving cooperation and coordination between federal, state, and local governments. Detailed consideration of devices used, including interstate compacts, grants-in-aid, and exercise of regulatory powers. (Writing Assignments) (Fall—day)

506 **Intergovernmental Relations II** (2) **Nash**

Advanced seminar on multi-government activities and current topics on intergovernmental relations. (Research Paper) (Spring—day)

Master of Laws candidates in the area of Land Use Management and Control who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

327 *Modern Real Estate Transactions*
349 *Local Government Law*
372 *Administrative Law*
380 *Environmental Law*
381 *Environmental Planning*

OTHER RELATED COURSES

451 *Federal Poverty Legislation*
458 *Housing the Poor*
460 *Current Problems in Civil Rights*

491 *Science Policy Formulation*
492 *Seminar: Science and the Legal Process*
494 *Use and Control of Nuclear Energy*
495 *Legal Protection against Technological Hazards*
558 *Taxation—Real Estate and Income*
560 *Taxation—State and Local*
590 *Population Control and the Law*
591 *Legislative Drafting*
593 *Seminar: American Legal History*

ENVIRONMENTAL LAW

Faculty Adviser: A.W. Reitze, Jr.

508 **Environmental Litigation** (2) **B. Cohen**

Special problems of environmental lawsuits. Topics include pleadings, procedural problems, selection of the proper court, problems of proof, remedies, selection of parties, discovery techniques and trial preparation, and the use of expert witnesses and scientific evidence. Prerequisite: Law 380 or graduate status. Enrollment limited to 25 students. (Choice of Research Paper or Clinical Work) (Spring—evening)

509 **Clinical Studies in Environmental Law** (2 or 3 or 4) **Reitze**

The student works on a project in the environmental law field under the supervision of both the faculty director of the program and a lawyer practicing environmental law. The project may involve working with a government agency, a congressional committee, a private practitioner, or a nonprofit public-interest environmental organization. Admission to this course requires second-semester second-year, third-year, or graduate standing and permission of the Director of the Environmental Law Program. Students who have mastered the fundamentals of environmental law are selected for this course. Normally this will require completion of at least Law 380. In addition, consideration will be based on the other environmentally related courses taken including those in Natural Resources Law and in Law, Science, and Technology, as well as work experience and other demonstrated interest in environmental law. Students may repeat this course for a maximum of 8 semester hours of credit. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring —day)

Master of Laws candidates in the area of Environmental Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

380 *Environmental Law*
381 *Environmental Planning*

Master of Laws candidates specializing in Environmental Law or Land Use Management and Control can use the following courses to complete the degree requirements.

598 *Research in Public Law*
599–600 *Thesis*

OTHER RELATED COURSES

413 *Public Policy and Mass Media*
431 *Government Procurement Law*
491 *Science Policy Formulation*
492 *Seminar: Science and the Legal Process*
494 *Use and Control of Nuclear Energy*
495 *Legal Protection against Technological Hazards*
501 *Land Development Law*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*
532 *International Law of the Sea*
560 *Taxation—State and Local*
571 *Land Development Planning*
590 *Population Control and the Law*
591 *Legislative Drafting*

PATENT AND TRADE REGULATION LAW

Faculty Advisers: L.J. Harris, I. Kayton, G.E. Weston

521 **International and Comparative Patent Law** (2)

Origin of patent laws. Patent systems of major countries—United Kingdom, France, Germany, USSR, and others. Comparative topical survey: kinds of patents, inventors and applicants, subject matter, novelty, administrative procedures, oppositions, revocation, renewal fees, compulsory licensing infringement, etc. International Convention for the Protection of Industrial Property: origin, membership, organization, substantive provisions. Treaties in the making, Common Market patent system, Nordic Patent, Patent Cooperation Treaty, Council of Europe activities. Prerequisite: Law 359 and 362, or former Law 360. (Take-home Examination) (Spring—evening)

522 **Patent and Know-how Licensing** (2) Finnegan

The business and legal criteria necessary to implement and maintain successful licensing programs; emphasis on the strategy and techniques that permit a proprietor of intellectual property to effectively exploit his status as the owner of a unique form of property. Subject areas covered are business objectives in licensing: legal outline of licensing situations; rights and duties of license parties; factors in selecting which inventions to license—financial, legal, and commercial; finding and selecting the right licensees; determining and negotiating the terms and clauses of the contract; administering and enforcing the license; antitrust and misuse constraints on the business and law of licensing; tax factors affecting the patent and know-how contract; special problems in trade secret, know-how, and show-how contracts; international licensing. Prerequisite: Law 359 and 362, or former Law 360. (Choice of Paper or Examination)

523 **Court Review of Patent Office Decisions** (2) Dunner

Procedure and procedural law involved in appealing to the U.S. Court of Customs and Patent Appeals and the U.S. District Courts from administrative decisions in the U.S. Patent Office. Designed to provide an exhaustive step-by-step procedural progression through *ex parte* and *inter partes* patent and trademark appeals. Emphasis on the forms used in the

many motions and proceedings before the U.S. Court of Customs and Patent Appeals and the District Courts required to perfect an appeal. Attendance at and critique of actual court proceedings. Introductory material includes administrative appeals before the U.S. Patent Office Board of Appeals. Prerequisite: Law 359 and 362, or former Law 360; or the equivalent in experience. (Examination)

524 **Chemical Patent Practice (2)** White

Seminar covering patent application preparation, prosecution, appeals, and licensing which are peculiar to chemical patent practice. Prerequisite: Law 359 and 362, or former Law 360; or comparable experience in the practice of patent law. (Examination)

525 **Copyright Law (2)** Cary

Historical background; formalities and essentials in securing a copyright; subject matter of copyright; remedies; international aspects of copyright under Berne Union, Universal Copyright Convention, Inter-American Convention; copyright licensing and performing rights societies. (Examination) (Spring—evening)

526 **U.S. Trademark Law: Selection, Use, Registration, Protection, and Franchising of Trademarks (2)** Leeds

Procedural and substantive law on use, registration, and protection of trademarks, including detailed registration procedure in the U.S. Patent and Trademark Office, common law rights to marks, and licensing and franchising arrangements. Prerequisite: Law 329. (Examination) (Fall —evening)

527 **Advanced Topics in Patent Law (2)** Harris

Multidisciplinary consideration in depth of current industrial-intellectual property problems; licensing and protection of industrial property; uses and abuses of patents; governmental regulation; protection and transactions abroad; international treaties and arrangements; role of patents, trademarks, and trade secrets in business; economic and social functions of patents, trademarks, and copyrights. Students are exposed to pertinent source materials, professional research methods and techniques. Opportunity for oral presentation and discussion of term papers prior to submission is provided to encourage instructional dialogue among students and the investigation and analysis of issues. Prerequisite: Law 359 and 362, or former Law 360; or the equivalent in experience. (Research Paper)

528 **Patent Interference Practice (2)**

Procedure and practice in inter partes determination of priority of invention in the U.S. Patent Office. Topics: conception, reduction to practice, diligence, corroboration, preliminary statements, motions, and testimony practice and final hearing. Also covered are current problem areas such as inventor determination, discovery, and privilege. Students required to draft procedural document selected from categories of preliminary statements and various interference motions. Prerequisite: Law 359 and 362, or former Law 360. (Examination) (Spring—evening)

529 **Research in Patent, Trademark, and Copyright Law (2)** Harris

Prerequisite: Law 417, 527, and related courses; and a *B* average. Request in writing, with proposed outline of topic of research, must be submitted

to the Dean at least one month prior to registration day. Work must be completed within the semester and paper submitted not later than last day of classes. Graduate students may repeat this course once for credit with the approval of the Dean. (Research Paper) (Fall and spring)

Master of Laws candidates in the area of Patent and Trade Regulation Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

329 *Unfair Trade Practices*
330 *Federal Antitrust Laws*
359 *Patent Law*
362 *Patent Office Practice*

OTHER RELATED COURSES

412 *Food and Drug Law*
417 *Seminar: Trade Regulation*
427 *Legal Aspects of International Business Transactions*
431 *Government Procurement Law*
491 *Science Policy Formulation*
492 *Seminar: Science and the Legal Process*
493 *Intergovernmental Aspects of Technological Change*
541 *Seminar: European Common Market*
562 *Income Taxation of Foreign Business and Investment*

INTERNATIONAL LAW AND COMPARATIVE LAW

Faculty Advisers: International Law—W.T. Mallison

531 **International Law of Air and Space** (2) Dembling

Study of the development of international law relating to the use of air space and outer space; analysis of air and space treaties in force; the role of various intergovernmental and nongovernmental international organizations; consideration of special problems such as liability resulting from space activities, space technology and arms control, and pollution and contamination of outer space; earth resources, sensing, etc. Enrollment limited to 25 students. (Research Paper) (Fall—evening)

532 **International Law of the Sea** (2) Muys

International law affecting allocation of authority over ocean space. Development of international law concerning territorial sea, contiguous zone, high seas, continental shelf, and deep seabed. Current legal and policy issues associated with these areas.

533 **Legal Regulation of International Coercion** (2) Mallison

Process of legal decision during war and at times when expectations of violence are high—contemporary international law of war and coercive measures short of war, such as limited naval blockade; legal aspects of modern methods of coercion—economic, political, psychological, and military; limited war and modes of preventing "escalation" to total war; regulation of hostilities including protection of war victims, civilian persons, and prisoners of war; war crimes and punishment; problems concerning weapons of mass destruction; and problems of transforming coercion situations to minimum order ones. (Research Paper) (Spring—day)

535 **Negotiation: Concepts and Techniques** (2) Ramundo, Tankel

Role of the lawyer and policy maker (client) in private, intragovernmental, and international negotiations; negotiations in private practice and governmental operations; achievement of consensus among contentious parties; negotiating techniques, including effective use of the "fallback"; gaming exercises in the actual conducting of negotiations, with practical work in the preparation of claim letters, agency and national positions, and negotiating instructions. Enrollment limited by the instructors. (Writing Assignments) (Spring—evening; summer 1975)

536 **Diplomatic and Consular Law and Practice** (1) Mitchell

Development of diplomatic and consular relations between nations; legal rights, privileges, functions, and immunities of diplomatic and consular personnel; extent of immunity from jurisdiction of foreign government missions and representatives; problems of taxation affecting foreign government missions and personnel. (Research Paper)

537 **The International Law of Human Rights** (2) del Russo

Theory of fundamental freedoms from its philosophical to its legal formulation in the American and French Revolutions, the individual, vis-a-vis, the State, human rights as rights against the national government, the emerging of the individual in the law of nations as a subject of rights and duties, the individual as subject of international concern, social and political forces stressing the need for international recognition and protection of human rights, the setting of human rights standards. The Universal Declaration and its influence over the law of nations, critical assessment of the work of the UN in the human rights field, regional approach to the international protection of human rights, analysis of the case law of the European Convention, human rights in the Inter-American system, state sovereignty and the international protection of human rights, a comparative approach to human rights' protection at the national level, due process and freedom of speech in light of different legal systems. (Research Paper) (Spring—day)

540 **Choice of Law and Forum in Transnational Contracts, Techniques of Conflict Avoidance** (2) Delaume

(Formerly Choice of Law and Forum in International Contracts)

Problems confronting the practitioner who endeavors to anticipate conflicts before they arise. Conflicts rules for transnational contracts; internationalization of contracts involving sovereign and international organizations. Techniques of conflict avoidance; express choice of law; conflict avoidance in absence of express stipulation of applicable law. Effectiveness of conflict avoidance; interrelationship of conflicts law and comparative law.

541 **Seminar: European Common Market** (2)

Analysis of treaty establishing European Economic Community; institutions of EEC and of member states and the internal law of member states as they affect doing business in EEC; series of problems arising out of establishing and operating business with and within EEC. Background in international law and antitrust law desirable. (Research Paper)

542 **Seminar: International Technical and Economic Assistance** (2)

Technical and economic assistance activities of the United States, the United Nations, and specialized agencies; problems of law, policy, pro-

gram, and administration; development planning; public and private transactions and institutions involving technical or economic assistance. (Research Paper)

546 **Soviet Law** (2) Ramundo

Concept of "socialist legality"; legal relationship of individual to state and other participants in Soviet society; role of Party in Soviet legal system; Soviet philosophy of law; state (constitutional) law; Soviet federalism, governmental apparatus, rights and obligations of citizenship; criminal law; property law; labor law; selected topics in civil law and procedure; international law. (Choice of Paper or Examination) (Fall—evening)

547 **Chinese Law** (2) Hsia

Emphasis on the legal system of Communist China; analysis of the constitutional law of the People's Republic of China, including general principles, state structure, and rights and duties of citizens; a brief survey of the administration of justice—courts, procuratorates, and lawyers; marriage law; land law; counterrevolutionary act and other criminal statutes; principles of civil law; Communist Chinese concept of international law. (Research Paper) (Spring—evening)

548 **Law of the Near East** (2) Liebesny

Law of the Arab countries, Turkey, and Iran, including basic principles of Islamic law, analysis of the present day codes, and investigation of the Western influences on laws of these countries. (Examination)

Master of Laws candidates in the area of Public International and Comparative Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

302 *Admiralty*
304 *United Nations Law and World Order*
305 *International Law and World Order*
307 *Comparative Law*
309 *Conflicts of Laws*

OTHER RELATED COURSES

427 *Legal Aspects of International Business Transactions*
494 *Use and Control of Nuclear Energy*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*
521 *International and Comparative Patent Law*
562 *Income Taxation of Foreign Business and Investment*

TAXATION

Faculty Advisers: J.R. Hambrick, D.B. Weaver

551 **Taxation—Partnerships and Subchapter S** (2) Weaver, Mendenhall

Income tax problems of partnerships and tax-option corporations (Subchapters K and S of the Internal Revenue Code of 1954). Prerequisite: Law 336. (Examination) (Spring—evening)

553 **Seminar: Estate Planning** (2) Weaver, Speiller, Horowitz

Study of the effective disposition of wealth by inter vivos gift and testamentary transfer; emphasis on income, estate, and gift tax considerations; use of the trust form in the transfer of wealth; use of insurance and jointly held property as part of the estate plan; planning for the continuation or disposition of the client's business interests. Preparation of an estate plan, with supporting documents is the major project for the course. Prerequisite: Law 325, 326, 336, and 338. Enrollment limited by the instructors. (Problem Assignments) (Spring—day and evening; summer 1975)

554 **Taxation—Deferred Compensation** (2) Chabot

Tax and labor law consequences of deferred compensation. Examination of new standards imposed by Employee Retirement Security Act of 1974. Consideration of tax consequences of "unqualified" plans, lump sum distributions, individual retirement accounts, and new requirement that defined benefit plans be insured by the Pension Benefit Guaranty Corporation. Prerequisite: Law 336. (Problem Assignments and Examination) (Fall—evening)

555 **Taxation—Special Corporation Problems** (2) Libin

Detailed study of the principal federal tax benefits of the corporate form of doing business. Consideration of problems involved in the tax planning of the corporate structure and corporate operation, including the tax definition of a corporation, the special deductions available to corporate payers, the compensation of the corporate executive and employee, the debt-equity question, the accumulated earnings tax, the personal holding company tax, multiple corporations, and consolidated returns. Survey of the types of corporations receiving special treatment under the Internal Revenue Code, such as financial institutions, real estate investment trusts, regulated investment companies, cooperatives, and small business corporations. Prerequisite: Law 340. (Research Paper) (Spring—evening)

557 **Taxation—Exempt Organizations** (2) Chabot, Hopkins, Myers

Tax-exempt organizations: policy and practice of preferred tax treatment for selected organizations and gifts to them. Statutes, regulations, and IRS practice; legislative origins, judicial interpretations, and policy consideration. Tests of qualification, disqualification, and limited tax preference. Mechanics of securing and retaining exemption; qualified exemption; unrelated business income; private inurement, political activity. Denial or loss of exemption. Return and reporting requirements. Comparative tax treatment of nonexempt and nonprofit organizations. Special sanctions with respect to private foundations, managers, and donors for improper, excessive, or prohibited activities. Enrollment may be limited. Prerequisite: Law 336. (Examination) (Fall and spring—evening)

558 **Taxation—Real Estate and Income** (2) Tucker

The effect of income taxes on the real estate market and real estate transactions: sales and exchange of real estate interests; various entities for the ownership and development of real estate; the impact of taxes on the landlord and tenant; the impact of taxes on the mortgagor and mortgagee, including the choice of financing techniques, such as the sale-leaseback; depreciation, amortization, and obsolescence; basis and basis adjustments; and casualties and other involuntary conversions. Prerequisite: Law 336. (Examination) (Spring—evening)

559 **Taxation—Oil and Gas** (2) Hambrick

Application of federal income tax law to producing segment of oil and gas industry. Classification of interests; treatment of exploration and development expenditures. Depletion allowance and concept of "economic interests." Sales vs. "leasing" transactions. Organization problems. Prerequisite: Law 336. (Examination)

560 **Taxation—State and Local** (2) Field

Taxation by state and local governments; problems of real and personal property taxation, sales and use taxes, business and personal income taxes. Limitations on taxation of interstate commerce. Congressional problems. Prerequisite: Law 336. (Choice of Research Paper or Examination) (Spring—evening; summer 1975)

562 **Income Taxation of Foreign Business and Investment** (2) Hambrick

The provisions and policies of the federal income tax law applicable to foreign income, including considerations affecting the choice of methods of engaging in foreign business and investment, treatment of controlled foreign corporations, allocation of income in foreign commerce, credit for foreign taxes, principles and trends of U.S. tax treaties. (Examination) (Spring—evening)

564 **Seminar: Special Problems of Tax Policy** (2) Field, A. Singer

Intensive study of selected aspects of the tax structure with primary attention given to the federal income tax. Problem areas are reviewed primarily from the standpoint of tax policy, including legal, economic, social, and practical considerations. Alternative solutions, including current legislative proposals, are examined. Prerequisite: Law 336, 340. (Research Paper) (Fall—evening)

567 **Seminar: Tax Practice and Procedure** (2) Irish, Muoio, Yurow

Review of the major areas of tax practice, including organization of the Internal Revenue Service, legislation, administrative regulations, tax planning, tax rulings, tax audit, settlement procedures, claims for refund, tax collection processes, criminal tax practice, and ethical problems in tax practice. Preparation of various documents is required. Prerequisite: 5 semester hours of taxation, including Law 336. (Problem Assignments) (Fall and spring—evening)

568 **Seminar: Federal Tax Litigation** (2)

Choice of forum. Conduct of civil tax cases: trial practice in the Tax Court, the District Courts, and the Court of Claims; appeal practice in the Courts of Appeals and on certiorari to the Supreme Court; analysis and drafting of pleadings, motions, and briefs; oral argument; settlements and stipulations of fact. Comparative responsibilities and procedures of IRS and of the Department of Justice for litigation control. Prerequisite: Law 567. (Writing Assignments)

Master of Laws candidates in the area of Taxation who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

336 *Taxation—Federal Income*
338 *Taxation—Federal Estate and Gift*
340 *Taxation—Federal Income, Corporations and Shareholders*
351 *Law and Accounting*

OTHER RELATED COURSES

404 *Securities Regulation*
424 *Business Planning*
427 *Legal Aspects of International Business Transactions*

URBAN LEGAL STUDIES

Faculty Advisers: R.S. Kuhn, M. Pock, D.P. Rothschild

571 **Land Development Planning** (3) McGrath*

Selected problems in urban and regional planning: applications of zoning, urban renewal, and special programs available for the implementation of development plans. Enrollment limited by the instructor. (Examination and Paper) (Spring—evening)

575 **Community Economic Development** (2) Stevenson

A substantive study of the organizational, financial, and tax-planning aspects of nonprofit, cooperative, and small business organizations. Problems illustrating some of the legal considerations of a nonprofit organization and a small business. Consideration of the problems of economic development and current efforts to stimulate it. Enrollment limited to 25 students. Prerequisite: Law 312, 336. (Problem Assignments) (Spring—day)

579 **Clinical Studies in Urban Law** (2 or 3) Sirulnik

Service in the Community Legal Clinic under the supervision of the Director of the Clinic. The Clinic helps Washington, D.C., area agencies and community groups with the problems of the inner-city and Washington's black and Spanish-speaking residents. Students are assigned to specific projects, such as providing legal counsel to the Director of the Neighborhood Development Center in Anacostia; investigating job discrimination complaints, including working with volunteer attorneys suing for relief; assisting in the preparation and conduct of a class action to remedy alleged police misconduct in a nearby black community; analyzing pending legislation and preparing testimony for an organization of ex-convicts; and working with urban planning students in preparing proposals for construction of housing and community facilities on surplus federal lands in Southeast Washington. Students who perform 10 hours' service each week for the semester receive 2 semester hours of credit; students who perform 15 hours' service each week for the semester receive 3 semester hours of credit. May be repeated for credit not to exceed 6 semester hours. This course may not be taken at the same time as Law 345, 487, or any litigating activities in Law 346. The grade of *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring)

Descriptions for the other courses in this area (listed below) appear elsewhere in "Advanced Courses."

451 **Federal Poverty Legislation** (2)

458 **Housing the Poor** (2)

---

*Dora Charles McGrath, Jr., is Professor of Urban Planning and Chairman of the Department of Urban and Regional Planning in the School of Government and Business Administration.

459 Problems of the Consumer (2 or 3)

501 Land Development Law (3)

505 Intergovernmental Relations I (2)

506 Intergovernmental Relations II (2)

560 Taxation—State and Local (2)

Master of Laws candidates in the area of Urban Legal Studies who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

349 *Local Government Law*
445 *Labor Relations in State and Local Governments*
477 *The Police and the Community*

OTHER RELATED COURSES

460 *Current Problems in Civil Rights*
475 *Law and Criminology I: Search for the Causes of Criminal Behavior*
476 *Law and Criminology II: Society's Responses to the Criminal Offender*
487 *Child Advocacy*
592 *Seminar: Constitutional Law*

OTHER ADVANCED COURSES

588 Legal Problems in Education (2) Long, Smalls

Public policy issues involving individual liberties and governmental obligations examined in the context of government's participation in education. Issues covered include legal framework within which states regulate schools, rights of students and teachers, obligations to avoid discrimination and provide equal educational opportunities, and role of courts, legislators, and educational officials in resolving such issues. (Research Paper) (Spring—day)

590 Population Control and the Law (2) Miller

Consideration of the concept of an "optimum" population through an examination of existing statutes which encourage or discourage population growth; relevant Supreme Court cases; international policies of a public law nature leading to population stabilization; and proposed legislation. (Research Paper)

591 Legislative Drafting (2) Zweben

Advanced instruction and practice in legislative drafting; overview of legislative process with emphasis on legislative drafting. Enrollment limited to 30 students. (Problem Assignments) (Spring—evening)

592 Seminar: Constitutional Law (2) H. Green, Silard

Group study of contemporary problems in constitutional law; process of constitutional litigation; problems of effectuating constitutional guarantees. (Research Paper) (Fall—day)

593 Seminar: American Legal History (2) D. Green

From the outbreak of the Revolution at Lexington and Concord to the death of John Marshall. An examination of men, events, and movements

significant in the unfolding of our laws and legal institutions in this formative period of our national life, including a critical examination of the place of the lawyer in a revolutionary age. Comparison of the role of the lawyer during the politically and socially unsettled time of Marshall with the role of the lawyer in today's troubled scene. Each member of the seminar presents the results of his research and thought either by an oral or by a written report. The grade of *CR* (Credit) or *NC* (No Credit) is given for this course. (Problem Assignments) (Fall—as arranged)

594 **Seminar: Privacy (2)** **Park**

Detailed study of civil interests in freedom from intrusion, with problems including government surveillance, private investigations, psychological testing, state regulation of marital relations, and conduct restrictions of public institutions. Discussions based on a small number of cases, selections from the literature of psychology and psychoanalysis, legal readings, and student research memoranda and papers. Students should have a substantial academic background in at least one of the following areas: psychology, sociology, philosophy, or civil rights law. In addition to the research paper, weekly memoranda will be required. Enrollment limited to 24 students. (Research Paper)

595 **Seminar: Supreme Court Practice (2)** Gressman

Study of the jurisdiction, practice, and procedure of the Supreme Court of the United States. Certiorari and appeal; the Court's Rules of Practice; how to prepare petitions and jurisdictional statements; the internal operation of the Supreme Court; other related aspects of Supreme Court practice, such as bail and stay applications, use of extraordinary writs, motions practice, oral argument, and briefing; *in forma pauperis* procedures. Students will prepare documents used in Supreme Court practice—petitions for certiorari, jurisdictional statements, and opposing briefs and arguments —using the actual conference list of cases pending before the Court. (Research Paper) (Spring—day)

597 **Independent Studies (arr.)** **Staff**

Limited to teaching fellows. The proposed program of study must be submitted to a faculty member in writing and approved prior to the beginning of the semester. May not be elected for more than 12 semester hours of credit. (Fall and spring)

598 **Research in Public Law (2)** **Staff**

Limited to graduate students with at least a *B* average who have had a seminar or comparable course in field of proposed research. Students are responsible for obtaining an adviser from the full-time faculty who is willing to sponsor their research. This adviser's name must be submitted to the Dean at registration. Work must be completed within the semester. Students may repeat this course once for credit with the approval of the Dean. (Research Paper) (Fall, spring, summer)

599–600 **Thesis (2–2)**

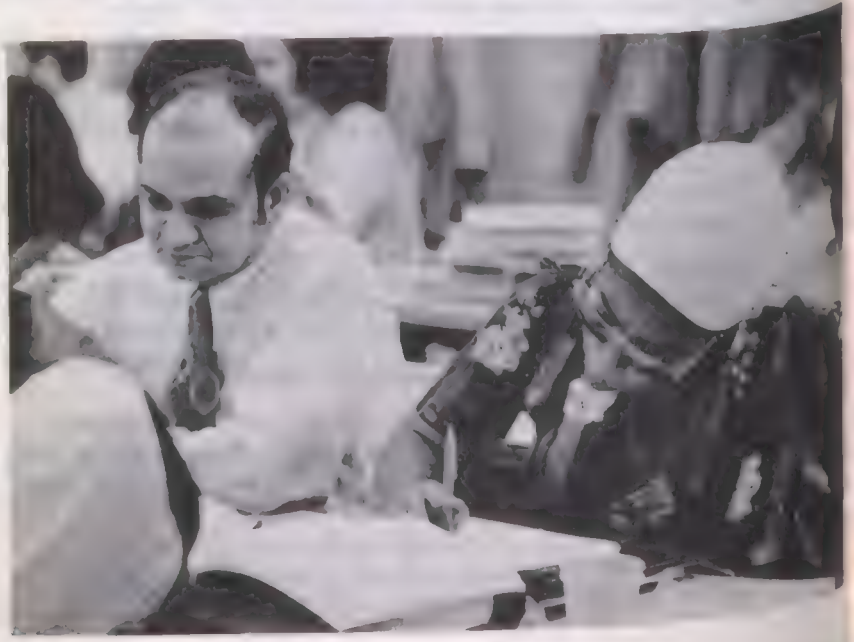
Students must register for two successive semesters. It is recommended that they not register for both sections in one semester. (Fall, spring, summer)

SPECIAL PROGRAMS IN RESEARCH AND INSTRUCTION

ENVIRONMENTAL LAW PROGRAM

Director A.W. Reitze

The Environmental Law Program seeks to provide both academic and clinical experience in the environmental law field. The program is predicated on an exchange of information and experience between the academic community and the world of the practicing attorney. The result is a forum for presentation, discussion, and implementation of legal avenues to cope with the critical environmental issues of the present and future generations. These goals are achieved through courses, seminars, research projects, and clinical activities.



GOVERNMENT CONTRACTS PROGRAM

Director G.J. Ginsburg

A comprehensive government contracts program provides continuing instruction for industry and government personnel in this field and a program of courses leading to the Master of Laws degree in Government Procurement Law. The program includes (1) short seminars, (2) one-week courses in advanced problems in the field, (3) an annual institute treating a problem of contemporary importance, (4) an annual conference in a major area, (5) compilation of materials for use in current courses, (6) publication of a series of monographs treating special problems in the field, and (7) special research projects.

INSTITUTE OF LAW, PSYCHIATRY, AND CRIMINOLOGY

Director T.F. Courtless, Jr.
Co-director Leon Yochelson

The Institute of Law, Psychiatry, and Criminology draws upon the insights and techniques of the behavioral sciences in areas of mutual concern to law and its sister disciplines, with special emphasis in the fields of forensic psychiatry and criminology.

INTERNATIONAL LAW PROGRAM

Director W.T. Mallison

The objective of the International Law Program is to provide a better understanding of how decisions in international law are actually made and the improvements which are needed in decision-making, sanctions processes, and accompanying legal institutions to promote the extension of the rule of law in the world community while considering the relationship between domestic and international law. The Program also includes the international aspects of business transactions and economic development. The objectives of the Program are implemented through course work and seminars for both J.D. and Post-J.D. degree students and through research and writing in the field.

LAND USE MANAGEMENT AND CONTROL PROGRAM

Director J.M. Brown

The social, economic, technological, political and legal interrelationships generated by the fact that land is a basic, limited-supply natural resource, capable of being subjected to differing but concurrent public and private uses, raise a growing number of issues involving management policy and control measures which are of critical concern to the future of the nation. The Land Use Management and Control Program, through a combination of academic, clinical, and game-simulation processes, seeks to provide an understanding of existing and pending problems, needs, means, and opportunities for solution with respect to this developing area of national concern.

LAW, SCIENCE, AND TECHNOLOGY PROGRAM

Director H.P. Green

The Law, Science, and Technology Program deals with the reciprocal relationships between law and science, providing courses, seminars, research studies, and publications to equip the legal profession to deal more effectively with the social, economic, political, and legal consequences of the nation's present massive commitment to scientific progress.

PATENT LAW PROGRAM

Director Irving Kayton

The Patent Law Program is designed for students in the J.D. and Post-J.D. degree programs whose intentions are to specialize in the practice of patent law. During the past eight years an organized program has been developed to offer as complete and as integrated collection of courses in patent law as possible. The course offerings in patent law now total 17 semester hours, far more than any other law school in the United States. In addition, courses in trademark and copyright law are also available (see the "Patent and Trade Regulation Law" area of specialization in the "Advanced Courses" section of this catalogue for a complete list and detailed description of the patent law courses offered). The object of the Patent Law Program is to provide the student with a concentration in patent law at a level of specialization and maturity which will enable him to advance more rapidly in this field.



THE GEORGE WASHINGTON LAW ASSOCIATION

Director of Law Alumni Relations Clifford A. Dougherty, J.D.(W.H.) 1964

THE GEORGE WASHINGTON LAW ASSOCIATION was founded in 1912 and has been affiliated with the General Alumni Association since 1926. Its purposes as stated in the constitution are to promote high standards of legal education, to keep the alumni of the school in close touch with one another, especially with members of their own classes, to gather and publish at intervals information as to the whereabouts and activities of these alumni, and to further the interests of the school.

Eligible members are those who have matriculated in the school or National University and have left in good standing, and any member or former member of the faculty of the school. Active members are those eligible members who are current contributors to the Law Annual Support Program of the University and life members of the George Washington Law Association.

The Association plans publication periodically of the Law Alumni Directory. Law alumni are urged to keep the Alumni Office informed of their whereabouts so that directory information can be kept up to date.

The Law Alumni Office is in the University Library, 2130 H Street, N.W., Washington, D.C. 20052.

OFFICERS FOR 1974–75

President.—Marion Edwyn Harrison, LL.B. 1954, LL.M. 1959; Washington, D.C.
First Vice President.—Richard A. Ward, B.A. 1961, J.D.(W.H.) 1965; Washington, D.C.
Second Vice President.—Betty Ann Thompson, B.A. 1946, LL.B. 1948; Arlington, Va.
Third Vice President.—Fred H. Daly, J.D. 1966; Akron, Ohio
Secretary.—Michael P. Bentzen, LL.B. 1964; Washington, D.C.
Treasurer.—Donald L. Mooers, LL.B. 1963; Washington, D.C.
Executive Committee:
Robert C. Bennett, Jr., LL.B. 1965; Houston, Texas
Joseph L. Brand, J.D. 1963; Washington, D.C.
Carol Elder Bruce, B.A. 1971, J.D. 1974; Arlington, Va.
Jacob Burns, LL.B.(W.D.) 1924; New York, N.Y.
Lawrence R. Caruso, B.A. 1949, J.D. 1950, LL.M. 1953; Washington, D.C.
Donn E. Cassity, B.A. 1950, J.D. 1953; Salt Lake City, Utah
Donald H. Ching, LL.B. 1953; Honolulu, Hawaii

Frankie Sue Delpappa, J.D. 1974; Reno, Nev.
Marshall C. Gardner, B.S. 1943, M.S. 1950, J.D.(W.H.) 1955; Washington, D.C.
George E. Goodwin, J.D. 1955; Dallas, Texas
Joseph G. Hitselberger, LL.B. 1957; Arlington, Va.
James P. Hume, LL.B. 1926; Chicago, Ill.
Neil B. Kabatchnick, J.D. 1954; Washington, D.C.
Charles H. Landesman, LL.B. 1963; Newark, N.J.
Jacob S. Levin, J.D. 1949; Langley Park, Md.
Carlos F. Lucero, J.D. 1964; Alamosa, Colo.
Lawrence Margolis, LL.B. 1961; Washington, D.C.
Charles L. Marinaccio, J.D.(W.H.) 1962; Washington, D.C.
Don W. Martens, J.D.(W.H.) 1963; Orange, Calif.
Robert C. McCandless, B.A. 1961, Law (1963); Washington, D.C.
William P. McClure, J.D.(W.H.) 1951, LL.M. 1954; Washington, D.C.
Bruce S. Mencher, B.A. 1957, J.D.(W.H.) 1960; Washington, D.C.
Carl A. Modecki, LL.B. 1967; Boston, Mass.
Alice L. O'Donnell, LL.B 1954; Washington, D.C.
Robert L. Oswald, LL.B. 1964; Washington, D.C.
Paul L. Pascal, J.D. 1965; Washington, D.C.
Edward A. Potts, LL.B. 1952; Washington, D.C.
Charles Price, J.D.(W.H.) 1972; Washington, D.C.
Charles K. Schanker, B.B.A. 1966, J.D.(W.H.) 1969; Washington, D.C.
Robert E. Smylie, J.D. 1942, LL.D. 1958; Boise, Idaho
Alexander L. Stevas, B.A. 1949, LL.B. 1951; Washington, D.C.
Robert C. Stone, LL.B. 1967; Ft. Lauderdale, Fla.
James R. Stoner, LL.B. 1952; Washington, D.C.
John P. Sutton, J.D. 1963; San Francisco, Calif.
Kirby L. Turnage, J.D. 1963; Athens, Ga.
Lewis H. Weiss, J.D. 1930; St. Petersburg, Fla.
Alexander W. Whitaker, J.D.(W.H.) 1972; Washington, D.C.
J.D. Williams, J.D. 1962; Washington, D.C.
Ronald A. Willoner, LL.B. 1960; College Park, Md.
Oscar A. Zabel, J.D. 1926; Seattle, Wash.
F. Elwood Davis, *ex officio*, LL.B. 1943; Washington, D.C.

THE UNIVERSITY

HISTORY AND ORGANIZATION

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the Federal City. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "that persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the

buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area is not without its reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

The University as it is now organized consists of Columbian College of Arts and Sciences (undergraduate); the Graduate School of Arts and Sciences; the professional schools, which include the National Law Center and the schools of Medicine and Health Sciences, Engineering and Applied Science, Education, Government and Business Administration, Public and International Affairs; the College of General Studies; the Division of University Students; the Summer Sessions; and the Division of Experimental Programs.

The George Washington University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the president is an ex officio member.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

LOCATION

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the United States Information Agency, the Department of the Interior, the Department of State, the General Services Administration, the National Academy of Sciences, and the Kennedy Center for the Performing Arts.

THE BOARD OF TRUSTEES

E.K. Morris, LL.D., D.P.S., *Chairman Emeritus*

Charles E. Phillips, LL.B., LL.M., *Chairman*
*Everett H. Bellows, M.A., *Vice Chairman*
James M. Mitchell, M.A., *Secretary*
Thaddeus A. Lindner, B.A. in Govt., *Assistant Secretary*

Robert C. Baker, LL.D.
Joel Barlow, B.A., J.D., LL.D.

* Alumni trustee.

George M. Bunker, B.S.
Jacob Burns, LL.B., LL.D.
George A. Butler, LL.B.
Mortimer M. Caplin, B.S., LL.B., J.S.D., LL.D.
Leon Chatelain, Jr.
Henry C. Clausen, J.D.
Jacqueline Cochran, L.H.D., LL.D., Sc.D.
Donald C. Cook, B.A., M.B.A., J.D., LL.M., L.H.D., LL.D.
*Joseph B. Danzansky, B.A., J.D.
Frank G. Dickey, M.A., Ed.D., LL.D., D.Lit., L.H.D.
Nancy B. Dudley, B.A. in Govt.
John B. Duncan, B.A., LL.B., LL.D.
Lloyd H. Elliott, M.A., Ed.D., LL.D., *President of the University*, ex officio
Katharine Graham, B.A.
Melville B. Grosvenor, B.S., Sc.D., LL.D.
Joseph H. Hirshhorn
Edwin K. Hoffman, B.A.
Joseph D. Hughes, B.S., J.D., LL.M., LL.D.
L.A. Jennings
David M. Kennedy, LL.B., M.A., LL.D.
Melvin R. Laird, B.A., L.H.D., D.Pol.S., LL.D.
*Sidney A. Levine, B.A., M.D.
Franklin J. Lunding, LL.B., LL.D.
Jeremiah Milbank, B.A., M.B.A.
Thornton W. Owen, B.S. in C.E., B.A.
Flaxie M. Pinkett, B.A.
*Abe Pollin, B.A. in Govt.
S. Dillon Ripley II, Ph.D., L.H.D., Sc.D.
Orville F. Rush, J.D., LL.D.
Carleton D. Smith
Charles E. Smith
Douglas R. Smith, B.S.C.
Mark Sullivan, Jr., B.A.
John W. Thompson, Jr., B.A.
William G. White, B.S. in C.E.
*Glen A. Wilkinson, B.S., J.D.
John J. Wilson, LL.B.
Watson W. Wise, Ph.B.
Stephen R. Woodzell, B.S. in E.E.
James O. Wright, B.S., J.D.
*Joseph S. Wright, LL.B., LL.D.

HONORARY TRUSTEES

Walter M. Bastian, LL.B., LL.D.
Harry F. Duncan
Newell W. Ellison, B.A., LL.B., LL.D.
Charles C. Glover, Jr., M.A., LL.B., LL.D.
Brooks Hays, B.A., J.D., LL.D., L.H.D., D.C.L., D.D., HH.D.
Alfred H. Lawson, LL.B., LL.D.

* Alumni trustee.

John K. McKee
Benjamin M. McKelway, Litt.D.
E.K. Morris, LL.D., D.P.S.
Godfrey L. Munter, B.A., LL.B., LL.D.
Alexander Wetmore, Ph.D., Sc.D.
Lloyd B. Wilson

OFFICERS OF ADMINISTRATION

THE UNIVERSITY

Lloyd Hartman Elliott, M.A., Ed.D., LL.D., *President*
Harold Frederick Bright, Ph.D., *Provost and Vice President for Academic Affairs*
Seymour Alpert, B.A., M.D., *Vice President for Development*
Carl James Lange, Ph.D., *Vice President for Research and Administration*
Charles Edward Diehl, B.Arch.Engr., B.C.E., M.B.A., *Vice President and Treasurer*
Ronald Paul Kaufman, B.S., M.D., *Acting Vice President for Medical Affairs*
William David Johnson, B.S., *Director of Planning and Budgeting*
Louis Harkey Mayo, B.S., J.S.D., *Vice President for Policy Studies and Special Projects*
Frederick Justin Naramore, B.S., C.P.A., *Comptroller*
William Parkhurst Smith, Jr., B.A., M.B.A., M.A. in Ed., *Vice President for Student Affairs*
Robert Gebhardtsbauer, B.A., M.A., *Registrar*
Joseph Young Ruth, B.A., *Director of Admissions*

THE NATIONAL LAW CENTER

Robert Kramer, B.A., LL.B., *Dean of the National Law Center*
W. Wallace Kirkpatrick, B.A., LL.B., *Associate Dean of the National Law Center*
Edward Andrew Potts, B.A., LL.B., *Associate Dean of the National Law Center, for Graduate Studies, Research, and Projects*

THE LAW LIBRARY

Hugh Yancey Bernard, Jr., B.A., B.S. in L.S., J.D., *Librarian*
Robert Gordon Bidwell, B.S., LL.B., M.S. in L.S., *Assistant Librarian for Management and Planning*
Malinda Carpenter Lee, B.A., M.A., M.S. in L.S., *Assistant Librarian*

THE NATIONAL LAW CENTER

Faculty and Staff of Instruction*

EMERITI

Carville Dickinson Benson, *Professor Emeritus of Law*
B.A. 1920, Johns Hopkins University; LL.B. 1923, S.J.D. 1926, Harvard University

Oswald Symister Colclough, *Professor Emeritus of Law; Dean of Faculties Emeritus; Director Emeritus of the Patent, Trademark, and Copyright Research Institute*
B.S. 1920, U.S. Naval Academy; LL.B. 1935, Sc.D. 1961, George Washington University; LL.D. 1946, Muhlenberg College; LL.D. 1958, Dickinson School of Law

William Thomas Fryer, *Professor Emeritus of Law*
B.A. 1922, LL.B. 1924, George Washington University; J.D. 1925, Yale University

James Oliver Murdock, *Professor Emeritus of Law*
Ph.B. 1916, University of Chicago; LL.B. 1924, Harvard University

Charles Bernard Nutting, *Professor Emeritus of Law*
B.A. 1927, J.D. 1930, University of Iowa; LL.M. 1932, S.J.D. 1933, Harvard University; LL.D. 1957, University of Pittsburgh; Litt.D. 1957, Geneva College; L.H.D. 1957, Seton Hill College; LL.D. 1960, Dickinson School of Law

ACTIVE

Jeffrey Marshall Albert, *Professor of Law*
B.A. 1956, Princeton University; LL.B. 1959, Harvard University; LL.M. 1962, New York University

Richard Chester Allen, *Professor of Law*
B.A. 1948, J.D. 1950, Washington University; LL.M. 1963, University of Michigan

Oscar Altshuler, *Professorial Lecturer in Law*
LL.B. 1951, George Washington University

Melvin Axilbund, *Professorial Lecturer in Law*
B.A. 1964, Pennsylvania State University; J.D. 1967, Georgetown University

†John Banzhaf III, *Professor of Law*
B.S. in E.E. 1962, Massachusetts Institute of Technology; J.D. 1965, Columbia University

* Professors, Associate Professors, Assistant Professors, and the Librarian of the Law Library constitute the Faculty of the National Law Center. The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the University Librarian are ex officio members of the faculty.
† On sabbatical leave spring semester 1976.

Jerome Aure Barron, *Professor of Law*
B.A. 1955, Tufts University; LL.B. 1958, Yale University; LL.M. 1960, George Washington University

Robert Howard Becker, *Professorial Lecturer in Law*
B.S.S. 1951, City University of New York, City College; J.D. 1954, Yale University

Alan Berkeley, *Associate Professorial Lecturer in Law*
B.S. 1964, Cornell University; J.D. 1967, Georgetown University

Hugh Yancey Bernard, Jr., *Professor of Law; Librarian of the Law Library*
B.A. 1941, University of Georgia; B.S. in L.S. 1947, Columbia University; J.D. 1961, George Washington University

Robert Brandon, *Assistant Professorial Lecturer in Law*
B.A. 1969, Syracuse University; J.D. 1972, George Washington University

James Milton Brown, *Professor of Law; Director of the Land Use Management and Control Program*
B.A. 1943, University of Illinois at Urbana-Champaign; J.D. 1963, University of Florida

Arthur Waldron Campbell, *Lecturer in Law*
B.A. 1966, Harvard University; J.D. 1971, West Virginia University; LL.M. 1974, Georgetown University

Milton Michael Carrow, *Visiting Professor of Law; Director of the Center for Administrative Justice*
B.A. 1933, Syracuse University; J.D. 1937, Harvard University

George Davis Cary, *Professorial Lecturer in Law*
B.S. 1932, University of Pennsylvania; J.D. 1938, George Washington University; LL.M. 1962, Georgetown University

Herbert Chabot, *Professorial Lecturer in Law*
B.A. 1952, City University of New York, City College; LL.B. 1957, Columbia University; LL.M. 1964, Georgetown University

Robert Howard Chanin, *Professorial Lecturer in Law*
B.A. 1956, City University of New York, Brooklyn College; LL.B. 1959, Yale University; M.A. 1961, Columbia University

John Cibinic, Jr., *Professor of Law*
B.A. 1956, University of Pittsburgh; J.D. 1960, George Washington University

Manuel Frederick Cohen, *Professorial Lecturer in Law*
B.S. 1933, City University of New York, Brooklyn College; LL.B. 1936, LL.D. 1962, Brooklyn Law School

Marcus Cohn, *Professorial Lecturer in Law*
B.A. 1935, J.D. 1938, University of Chicago; LL.M. 1940, Harvard University

Raymond Douglas Cotton, *Professorial Lecturer in Law and in Medical and Public Affairs*
B.A. 1965, Monmouth College, New Jersey; J.D. 1968, M.S. in Hygiene 1969, Harvard University

Thomas Francis Courtless, Jr., *Professor of Law and Sociology; Director of the Institute of Law, Psychiatry, and Criminology*
B.A. 1955, Pennsylvania State University; M.A. 1960, Ph.D. 1966, University of Maryland

Clair Allan Cripe, *Professorial Lecturer in Law*
B.A. 1954, Oberlin College; LL.B. 1957, Harvard University

Stephen Ira Danzansky, *Associate Professorial Lecturer in Law*
B.A. 1961, Washington and Lee University; J.D. 1964, George Washington University

Georges Rene Delaume, *Professorial Lecturer in Law*
Diplôme de Docteur en Droit 1947, University of Paris; M.Comp.L. 1953, George Washington University

Alessandra Luini del Russo, *Professorial Lecturer in Law*
Doctor Litterarum 1939, University of Milan; Dr.Jur. 1943, University of Pavia; M.Comp.L. 1949, George Washington University

Paul Gerald Dembling, *Professorial Lecturer in Law*
B.A. 1940, M.A. 1942, Rutgers—The State University (New Brunswick); J.D. 1951, George Washington University

James Francis Doherty, *Professorial Lecturer in Law*
B.A. 1953, Catholic University of America; LL.B. 1957, Georgetown University

Linda Colvard Dorian, *Assistant Professorial Lecturer in Law*
B.A. 1968, University of Maryland; J.D. 1972, George Washington University

Donald Robert Dunner, *Professorial Lecturer in Law*
B.S. in Ch.E. 1953, Purdue University; J.D. 1958, Georgetown University

Meyer Eisenberg, *Professorial Lecturer in Law*
B.A. 1953, City University of New York, Brooklyn College; LL.B. 1958, Columbia University

Elyce Zenoff Ferster, *Professor of Law*
B.S. 1951, University of Wisconsin—Madison; LL.B. 1954, Northwestern University

Thomas Francis Field, *Professorial Lecturer in Law*
B.A. 1954, University of Notre Dame; M.A. 1958, University of Oxford; J.D. 1961, Harvard University; LL.M. 1968, Georgetown University

Marcus Bartlett Finnegan, *Professorial Lecturer in Law*
B.S. 1949, U.S. Military Academy; LL.B. 1955, University of Virginia; LL.M. 1957, George Washington University

Salvatore Francis Fiscina, *Associate Professorial Lecturer in Law*
B.A. 1963, Harvard University; M.D. 1967, University of Rochester; J.D. 1973, George Washington University

Michael Richard Flyer, *Professorial Lecturer in Law*
B.A. 1959, LL.B. 1962, University of Michigan

Mark Foster, *Assistant Professorial Lecturer in Law*
B.A. 1965, Yale University; J.D. 1971, Harvard University

Gilbert Jerome Ginsburg, *Professor of Law; Director of the Government Contracts Program*
B.A. 1954, B.A. in Law 1955, J.D. 1957, University of Chicago

Laurence Stephen Gold, *Professorial Lecturer in Law*
B.A. 1958, Princeton University; LL.B. 1961, LL.M. 1962, Harvard University

David Crittenden Green, *Professor of Law*
B.A. 1948, Harvard University; LL.B. 1951, University of Virginia

Harold Paul Green, *Professor of Law; Director of the Law, Science, and Technology Program*
B.A. 1942, J.D. 1948, University of Chicago

Eugene Gressman, *Professorial Lecturer in Law*
B.A. 1938, J.D. 1940, University of Michigan

Jackson Reid Hambrick, *Professor of Law*
B.A. 1938, Wofford College; LL.B. 1942, Duke University

Louis James Harris, *Professor of Law*
B.A. 1932, Cornell University; LL.B. 1939, S.J.D. 1942, Brooklyn Law School; LL.M. 1948, George Washington University

Murdock Head, *Airlie Professor of Medical and Public Affairs*
D.D.S. 1947, University of Louisville; M.D. 1953, University of Vermont; J.D. 1958, George Washington University

William Norman Hedeman, Jr., *Associate Professorial Lecturer in Law*
B.A. 1964, Gettysburg College; J.D. 1968, University of Maryland; LL.M. 1972, George Washington University

Harold Lester Hirsh, *Professorial Lecturer in Law*
M.D. 1942, Georgetown University

Bruce Richard Hopkins, *Associate Professorial Lecturer in Law*
B.A. 1964, University of Michigan; J.D. 1967, LL.M. 1971, George Washington University

Eugene Gary Horowitz, *Professorial Lecturer in Law*
B.A. in Govt. 1958, J.D. 1961, George Washington University

Tao-tai Hsia, *Professorial Lecturer in Law*
LL.B. 1945, National Cheng-chi University, China; LL.M. 1950, J.S.D. 1952, Yale University

Leon Eugene Irish, *Professorial Lecturer in Law*
B.A. 1960, Stanford University; J.D. 1964, University of Michigan; Ph.D. 1972, Oxford University

John Wingfield Jackson, *Adjunct Professor of Law*
B.S. 1928, University of Pennsylvania; J.D. 1932, George Washington University

Hugh Donald Jascourt, *Professorial Lecturer in Law*
B.A. 1956, University of Pennsylvania; J.D. 1960, Wayne State University

Alan Hirsh Kaplan, *Professorial Lecturer in Law*
B.A. 1951, LL.M. 1957, New York University; LL.B. 1954, Harvard University

Irving Kayton, *Professor of Law; Director of the Patent Law Program*
B.A. 1951, Cornell University; LL.B. 1957, New York University; LL.M. 1964, J.S.D. 1967, Columbia University

John Alexander Kendrick, *Professorial Lecturer in Law*
B.A. 1942, LL.B. 1943, George Washington University

W. Wallace Kirkpatrick, *Professor of Law; Associate Dean of the National Law Center*
B.A. 1934, LL.B. 1938, Harvard University

Robert Kramer, *Professor of Law; Dean of the National Law Center*
B.A. 1935, LL.B. 1938, Harvard University

Roger Stroock Kuhn, *Professor of Law*
B.A. 1948, Harvard University; J.D. 1951, Columbia University

Henry West Leeds, *Professorial Lecturer in Law*
B.S. in Econ. 1953, University of Pennsylvania; J.D. 1956, University of Michigan

Jack Lewis, *Professorial Lecturer in Law*
B.A. 1965, Brown University; J.D. 1969, Cornell University

Jerome Bernard Libin, *Professorial Lecturer in Law*
B.S. 1956, Northwestern University; J.D. 1959, University of Michigan

Herbert Joseph Liebesny, *Professorial Lecturer in Law; Coordinator, Afghan Legal Training Program*
J.D. 1935, University of Vienna

David Clark Long, *Associate Professorial Lecturer in Law*
B.A. 1961, M.A. 1963, University of Hawaii; J.D. 1966, University of Chicago

William Thomas Mallison, *Professor of Law; Director of the International Law Program*
J.S.D. 1967, Yale University

Martin Guilbert Malsch, *Associate Professorial Lecturer in Law*
B.S. 1964, College of the Holy Cross; J.D. 1968, University of Connecticut

Bessie Margolin, *Professorial Lecturer in Law*
B.A., LL.B. 1930, Tulane University of Louisiana; J.S.D. 1933, Yale University

Arthur Francis Mathews, *Professorial Lecturer in Law*
B.A. 1959, Union College, New York; J.D. 1962, Union University, New York; LL.M. 1964, Georgetown University

Louis Harkey Mayo, *Professor of Law; Vice President for Policy Studies and Special Projects*
B.S. 1940, U.S. Naval Academy; LL.B. 1949, University of Virginia; J.S.D. 1953, Yale University

Paul Francis McArdle, *Professorial Lecturer in Law*
B.S.S. 1941, LL.B. 1948, Georgetown University

John Ryan Mendenhall, *Professorial Lecturer in Law*
B.S.C. 1950, University of Notre Dame; J.D. 1953, Harvard University

Leroy Sorenson Merrifield, *Professor of Law*
B.A. 1938, LL.B. 1941, University of Minnesota; M.P.A. 1942, S.J.D. 1956, Harvard University

George Peter Michaely, Jr., *Professorial Lecturer in Law*
B.S. 1948, LL.B. 1956, University of Notre Dame

*Arthur Selwyn Miller, *Professor of Law*
B.A. 1938, Willamette University; LL.B. 1949, Stanford University; J.S.D. 1959, Yale University

Lawrence Hillel Mirel, *Professorial Lecturer in Law*
B.A. 1957, Oberlin College; LL.B. 1961, Columbia University

Milton Mitchell, *Professorial Lecturer in Law*
J.D. 1942, George Washington University

Ralph Anthony Muoio, *Professorial Lecturer in Law*
B.S. 1955, University of Pennsylvania; J.D. 1961, Harvard University

Jerome Christian Muys, *Professorial Lecturer in Law*
B.A. 1954, Princeton University; LL.B. 1957, Stanford University

John Holt Myers, *Associate Professorial Lecturer in Law*
B.A. 1943, Princeton University; LL.B. 1949, University of Michigan; LL.M. 1955, Georgetown University

Ralph Clarke Nash, Jr., *Professor of Law*
B.A. 1953, Princeton University; J.D. 1957, George Washington University

Nicholas Stephen Nunzio, *Professorial Lecturer in Law*
B.A. in Govt. 1957, LL.B. 1960, George Washington University

Lester Nurick, *Professorial Lecturer in Law*
B.S.S. 1934, City University of New York, City College; LL.B. 1937, Brooklyn Law School

Saul Chesterfield Oppenheim, *Distinguished Scholar and Adviser in the National Law Center*
B.A. 1918, M.A. 1920, Columbia University; J.D. 1926, S.J.D. 1929, University of Michigan; LL.D. 1973, George Washington University

Donald Edward Osteen, *Associate Professorial Lecturer in Law*
B.A. 1963, Syracuse University; J.D. 1968, LL.M. 1972, Georgetown University

Robert Eugene Park, *Professor of Law*
B.S. 1952, B.A. 1957, J.D. 1961, University of Florida; LL.M. 1965, Yale University

David Edward Pinsky, *Professorial Lecturer in Law*
B.A. 1943, LL.B. 1950, University of Pennsylvania

Maximilian Pock, *Professor of Law*
J.D. 1958, University of Iowa; S.J.D. 1962, University of Michigan

Edward Andrew Potts, *Professor of Law; Associate Dean of the National Law Center, for Graduate Studies, Research, and Projects*
B.A. 1949, University of Michigan; LL.B. 1952, George Washington University

Bernard Ramundo, *Professorial Lecturer in Law*
B.A. 1947, City University of New York, City College; LL.B. 1949, M.A. 1957, Columbia University; Ph.D. 1966, American University

Arnold Winfred Reitze, *Professor of Law; Director of the Environmental Law Program*
B.A. 1960, Fairleigh Dickinson University; J.D. 1962, Rutgers The State University, Newark

David Robinson, Jr., *Professor of Law*
B.A. 1950, Reed College; J.D. 1956, Columbia University; LL.M. 1965, Harvard University

Robert St. John Roper, *Assistant Professorial Lecturer in Law*
B.S. 1966, Boston University; J.D. 1969, Georgetown University

Eugene Harvey Rotberg, *Professorial Lecturer in Law*
B.S. 1951, Temple University; LL.B. 1954, University of Pennsylvania

Donald Phillip Rothschild, *Professor of Law*
B.A. 1950, University of Michigan; J.D. 1965, University of Toledo; LL.M. 1966, Harvard University

Joseph Michael Francis Ryan, Jr., *Professorial Lecturer in Law*
B.A. 1943, St. Joseph's College, Pennsylvania; LL.B. 1950, LL.M. 1952, Georgetown University; Judge, District of Columbia Court of General Sessions

William Gray Schaffer, *Assistant Professorial Lecturer in Law*
B.A. 1964, LL.B. 1967, Yale University

* On sabbatical leave fall semester 1975.

John Edward Scheuermann, *Lecturer in Law*
B.A. 1966, St. Michael's College; J.D. 1973, Georgetown University

Lewis Aaron Schiller, *Professor of Law*
B.A. 1950, LL.B. 1952, University of Texas at Austin; M.A. 1958, Tufts University

Teresa Moran Schwartz, *Professor of Law*
B.A. 1965, Stanford University; J.D. 1971, George Washington University

Lester Barry Seidel, *Professorial Lecturer in Law*
B.A. 1966, University of Michigan; J.D. 1969, George Washington University; LL.M. 1970, University of Missouri—Columbia

David Earl Seidelson, *Professor of Law*
B.A. 1951, LL.B. 1956, University of Pittsburgh

David James Sharpe, *Professor of Law*
B.A. 1950, University of North Carolina at Chapel Hill; LL.B. 1955, S.J.D. 1969, Harvard University

John Silard, *Professorial Lecturer in Law*
B.A. 1949, LL.B. 1952, Columbia University

Herbert Myron Silverberg, *Associate Professorial Lecturer in Law*
B.A. 1961, LL.B. 1968, University of Pennsylvania

Andrew Warren Singer, *Professorial Lecturer in Law*
B.S. in Econ. 1963, University of Pennsylvania; LL.B. 1966, Harvard University

Eric Scott Sirulnik, *Visiting Associate Professor of Law; Director of the Community Legal Clinic*
B.A. 1965, Franklin and Marshall College; J.D. 1968, Boston University; LL.M. 1970, George Washington University

Dudley Graham Skinker, *Clerk of the Trial Practice Court*
LL.B. 1940, George Washington University

*O'Neal Smalls, *Professor of Law*
B.S. 1964, Tuskegee Institute; J.D. 1967, Harvard University

William Marvin Speiller, *Professorial Lecturer in Law*
B.S. 1950, LL.B. 1952, Syracuse University; LL.M. 1953, Harvard University

James Edward Starrs, *Professor of Law*
B.A., LL.B. 1958, St. John's University, New York; LL.M. 1959, New York University

Alexander Louis Stevas, *Professorial Lecturer in Law*
B.A. 1949, LL.B. 1951, George Washington University

Russell Bennett Stevenson, Jr., *Professor of Law*
B.M.E. 1964, Cornell University; J.D. 1969, Harvard University

Jerome Kenneth Tankel, *Professorial Lecturer in Law*
B.A. 1957, University of Illinois; J.D. 1963, Harvard University; LL.M. 1968, George Washington University

Theodore Tannenwald, Jr., *Professorial Lecturer in Law*
B.A. 1936, Brown University; LL.B. 1939, Harvard University

Robert Max Tobias, *Professorial Lecturer in Law*
B.A. 1965, M.B.A. 1967, University of Michigan; J.D. 1969, George Washington University

Stefan Franklin Tucker, *Professorial Lecturer in Law*
B.B.A. 1960, J.D. 1963, University of Michigan

Robert Benjamin Washington, Jr., *Associate Professorial Lecturer in Law*
B.S. 1966, St. Peter's College; J.D. 1969, Howard University; LL.M. 1971, Harvard University

David Benson Weaver, *Professor of Law*
B.A. 1943, Ohio Wesleyan University; J.D. 1948, Case Western Reserve University

Frederick Weisberg, *Assistant Professorial Lecturer in Law*
B.A. 1965, Cornell University; J.D. 1968, University of Michigan

†Glen Earl Weston, *Professor of Law*
B.S. 1943, University of Maryland; J.D. 1948, George Washington University

---

* Begins academic year 1976–77.
† On sabbatical leave spring semester 1976.

John Leslie White, *Professorial Lecturer in Law*
B.A. 1948, M.S. 1949, Kalamazoo College; J.D. 1958, George Washington University

Dudley Ridault Williams, *Professorial Lecturer in Law*
B.A. 1961, LL.B. 1964, Howard University

Gregory Howard Williams, *Lecturer in Law*
B.A. 1966, Ball State University; M.A. 1969, University of Maryland; J.D. 1971, George Washington University

Judy Lyons Wolf, *Associate Professorial Lecturer in Law*
B.A. 1964, Manhattanville College; J.D. 1970, Georgetown University

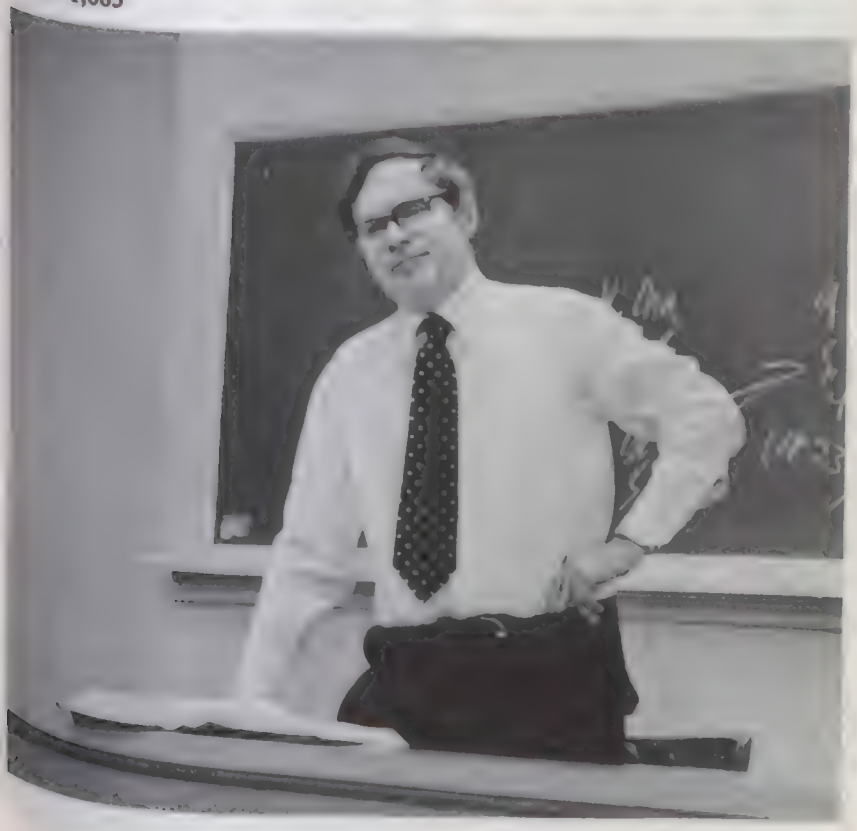
John Jesse Yurow, *Professorial Lecturer in Law*
B.A. 1953, J.D. 1958, George Washington University

Murray Zweben, *Professorial Lecturer in Law*
B.S. 1952, M.S. 1953, State University of New York at Albany; LL.B. 1959, George Washington University

Summary of Registration, Fall Semester 1974-75

	1st year	*2nd year*	*3rd year*	*4th year*	*Graduate*	*Other*
Day	302	374	297	.....	38	5
Evening	115	115	70	89	197	83

Total: 1,685





APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate* and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs† of The George Washington University as soon after order is restored as is practicably possible.

* The University Senate has been renamed the Faculty Senate.
† The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968*:

The George Washington University is opposed to discrimination based on race, color, creed, sex, or national origin. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

---

* Amended January 18, 1973.

(c) who disobeys general regulations of the University, or
(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.*

* The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and should be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the College

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE AND HEALTH SCIENCES, Admissions Office, School of Medicine and Health Sciences

SUMMER SESSIONS CATALOGUE, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL (Preregistration and Revised) AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

INDEX

A

Academic dishonesty, 47
Academic status of the University, 90
Academic work load, 42
Accident insurance, 50
Accreditation, University, 90
Administrative law—economic regulation:
  Courses, 56, 60, 62–63
  LL.M. specialization, 19
Administration, officers of, 92
Admission:
  Continuing legal education students, 27
  J.D. program, 11, 31
  Master's and doctoral programs, 31
  Students from foreign institutions, 24–25, 30–31
  Test, law school, 11, 30
  Unclassified students, 26–27, 30–31
Admissions, Office of, 10
Advanced standing, J.D. degree, 11
Advocate, 9
Alumni association, 87–88
Alumni office, 87
Apellate Case Club, Van Vleck, 10, 17
Appendix: recently established regulations, 101–3
Application:
  For admission, 30–32
  For graduation, 46–47
Assistantships, research, 38–39
Attendance, 42
Awards, 40–41

B

Bacon Hall, 10
Bar association, student, 10, 18
Bar review course, 42
Beta Kappa Pi, 18
Black America law student association, 10, 17
Board of Trustees, 90–92
Buildings of the National Law Center, 9–10

C

Calendar, 1975–76, 4–5
Case Club, Van Vleck Appellate, 10, 17
Changes in program of studies, 42
Choice of paper or examination, 43
Civil rights research council, law students, 10, 18
Class profile, entering, fall 1974–75, 11–12
Clinical law program, 9, 53
Clinical work, 52
Cloyd Heck Marvin Center, 50
Coif, Order of the, 16
Comparative law:
  Courses, 54–55, 76–78
Computer Center, 48–49
Conduct, 101–3
Consortium of Universities of the Washington Metropolitan Area, Inc., 22
Consumer protection center, 10
Continuing legal education, 9, 27
Continuous registration, 34, 46
Corporation law:
  Courses, 55, 56, 57, 63–64
  LL.M. specialization, 19
Course offerings, time of, 28, 52
Courses in other departments of the University, 21, 42
Courses, numbering of, 52–53
Courses of instruction, 52–83
  Advanced, 62–83
  For J.D. candidates:
    Elective, 54–62
    Required, 52–54
Credit hours, 52
Credit/no credit option, 44
Credit, summer school, 46
Curriculum, J.D., 13–14

D

Day classes, 28, 52
Day division, 13, 28
D.C. law students in court program, 58
Degree requirements:
  Foreign students, 26
  J.D. program, 14–16
  LL.M. program, 20
  M.Comp.L. programs, 26
  S.J.D. program, 22–23
Delta Theta Phi, 18
Dishonesty, academic, 47
Dismissal of students, 48, 101–3
Dissertation, S.J.D., 22–23
Doctor of Juridical Science, degree of, 19, 22–23, 26
Dormitories, 49

E

Emeriti, Faculty, 93
Employment, student, 51
English, test, as a foreign language, 24–25
Entering classes, J.D. program, 11–12
Entrance requirements:
  J.D. program, 11, 26
  LL.M. program, 20, 26
  M.Comp.L. programs, 26
  S.J.D. program, 22, 26
Environmental Law:
  Courses, 60, 73–74
  LL.M. specialization, 19
  Program, 84
Evening classes, 28, 52
Evening division, 14, 28
Examinations, 28, 43–44, 52
  Research paper in lieu of, 43, 52
  Take-home, 52
Exclusion and probation for poor scholarship, 45–46

F

Faculty, 93–99
Fees, 34–35
  Food service rates, 49
  Payment of, 35–37
  Residence hall rates, 49
Fellowships, 40
Financial aid, 38–40
Financial regulations, 34–38
Food service, 49
Foreign students, degree programs for, 24–26
Fraternities, law, 18

G

George Washington Law Association, 87–88
George Washington Law Review, 10, 16, 55
Government contracts program, 10, 85
Government procurement law:
  Courses, 65
  LL.M. specialization, 19
Grades, 44–45
Graduate and Professional School Financial Aid Service, 38
Graduate courses in other departments, 21, 42
Graduation:
  Fees, 34
  Requirements, 46–47

H

Health service, student, 50
History of the National Law Center, 6–8
History of the University, 89–90
Honorary Trustees, 91–92
Honors, 16, 21
Hours of instruction, 28, 52
Housing, 49

I

Institute of Law, Psychiatry, and Criminology, 10, 85
Institutions in which 1974–75 entering law students earned degrees, 12
Insurance, health and accident, 50
International law:
  Courses, 54–55, 76–78
  LL.M. specialization, 19
  Program, 85
  Society, 17
International Law and Economics, Journal of, 10, 16, 56

J

Jacob Burns Law Library, 10
Joint Juris Doctor/Master's degree program, 18
Journal of International Law and Economics, 10, 16, 56
Juris Doctor program, 11–18

L

La Raza, 10, 17
Labor Law:
  Courses, 57, 58, 65–67
  LL.M. specialization, 19
Language test for foreign students, 24–25
Land use management and control:
  Courses, 56, 59, 60, 71–73
  LL.M. specialization, 19
  Program, 85
Law and poverty:
  Courses, 67–68
  LL.M. specialization, 19
Law, beginning study of, 13–14
Law Center organizations, 17–18
Law fraternities and sororities, 18
Law library, 9–10
Law, psychiatry, and criminology:
  Courses, 68–70
  Institute of, 10, 85
  LL.M. specialization, 19
Law Review, 10, 16, 55
Law School Admission Test, 11, 30
Law School Data Assembly Service, 28
Law, science, and technology:
  Courses, 70–71
  LL.M. specialization, 19
  Program, 86
Law students civil rights research council, 10, 18
Legal aid bureau, 8, 10, 59
Legal education, continuing, 27
Library, 9–10
  Officers, 92
Loan funds, 39–40
Location of the National Law Center, 8–9
Location of the University, 90
Lost and found, 48

M

Marvin, Cloyd Heck, Center, 50
Master of Comparative Law, degree of, 24, 26
Master of Laws, degree of, 19–22, 26
Master's/Juris Doctor degree, joint program, 18
Master's thesis, 20–21, 81
Military leave, 47
Moot court competition, 9, 17
Munson Hall apartments, 49

N

Numbering of courses, 52–53

O

Objectives of the National Law Center, 9
Officers of Administration, 92
Order of the Coif, 16
Organizations, Law Center, 17–18

P

Patent and trade regulation law:
Courses, 56, 59, 60, 74–76
LL.M. specialization, 19
Patent law club, 18
Patent law program, 86
Phi Alpha Delta, 18
Phi Delta Phi, 18
Placement office, 9, 51
Placement service, 51
Poverty, law and:
Courses, 67–68
LL.M. specialization, 19
Pre-Law Handbook, 31
Prepaid and deferred payment plan, 37
Prizes, 40–41
Probation, 45–46
Problem assignments, 52
Profile of entering class, 1974–75, 11–12
Programs, right to change, 48
Projected tuition and fee increases, 35
Property responsibility, 48
Publications, 16

R

Readmission, 32
Readmitted student, 33
Refunds, 37–38
Registration, 29–30
Summary of, fall semester, 1974–75, 99
Regulations, 42–48
Financial, 34–38
Release of student information, policy on, 47–48
Research and instruction, special programs in, 84–86
Research assistantships, 38–39
Research paper, 43, 52
Residence halls, 49
Residence requirements, 15–16, 20, 22, 26
Rules, right to change, 48

S

Scholarship, 14–15, 20, 26
Scholarships, 38–40
Sororities, law, 18
Special programs in research and instruction, 84–86
Staff of instruction, 93–99
Stockton Hall, 10
Student bar association, 10, 18
Student employment, 51
Student enrollment, 29
Student health service, 50
Student information, release of, 47–48
Student services, 49–51
Students-in-court program, 58
Summary of registration, fall semester, 1974–75, 99
Summer school credit, 46
Summer term, 29
Suspension, 47, 101–3

T

Take-home examination, 52
Tax law association, 18
Taxation:
Courses, 57–58, 59, 78–81
LL.M. specialization, 19
Tests:
English as a foreign language, 24–25
Law school admission, 11, 30
Thesis, Master's, 20–21, 81
Time of course offerings, 28–52
Transcripts of record, 24, 30, 32, 35, 46
Transfer from day division to evening division, 42
Trial Practice Court, 9, 60–61
Trustees, Board of, 90–92
Tuition:
Deposit, 11, 34
Fees, 34
Projected increases, 35
Refund of, 37–38

U

Unclassified students, 26–27, 31–32
University, academic status of, 90
University Center Fee, 34
  Projected increase, 35
University Computer Center, 48–49
University—history, location, and organization, 89–90
Urban legal studies:
  Courses, 59, 66, 67–68, 69, 71–72, 81–82
  LL.M. specialization, 19

V

Van Vleck Appellate Case Club, 10, 17
Veterans education, 51

W

Withdrawals, 37–38
Women's rights committee, 18
Writing assignments, 52

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Asso
ciate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.
Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bache
lor of Science in Geodetic and Cartographic Science (B.S. in Geod. an
Cart.Sc.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master o
Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.)
Master of Forensic Sciences (M.Forens.S.), Master of Music (Mus.M.)
Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers
Master of Science in Forensic Science (M.S. in Forens.S.), Master of Scienc
in Special Studies (M.S. in Sp.Std.), and Doctor of Philosophy (Ph.D.)

SCHOOL OF MEDICINE AND HEALTH SCIENCES: Associate in Science (A.S.)
Bachelor of Science (B.S.), and Doctor of Medicine (M.D.)

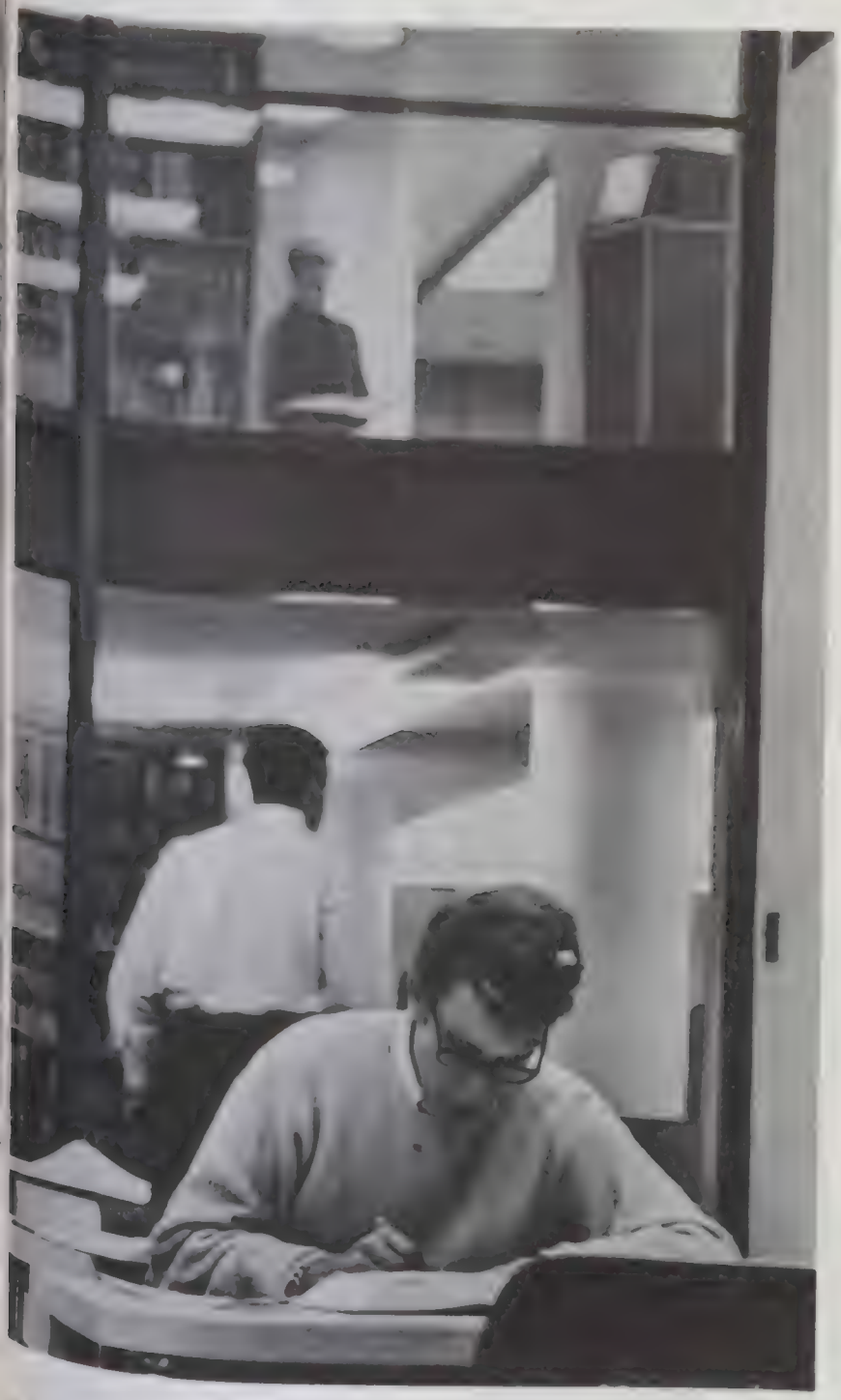
NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master
of Comparative Law (M.Comp.L.), Master of Comparative Law (American
Practice) (M.Comp.L.[Am.Prac.]), and Doctor of Juridical Science (S.J.D

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil En
gineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S
(E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Mas
ter of Engineering Administration (M.E.A.), Master of Science (M.S.), and
Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor
of Science in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master
of Arts in Education (M.A. in Ed.), Master of Arts in Teaching (M.A.T.)
Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business
Administration (B.B.A.), Bachelor of Science in Administration (B.S. in
Adm.), Bachelor of Science in Health Care Administration (B.S. in H.C.A.)
Master of Arts in Government (M.A. in Govt.), Master of Arts in Health
Care Administration (M.A. in H.C.A.), Master of Business Administration
(M.B.A.), Master of Public Administration (M.P.A.), Master of Science in
Administration (M.S. in Adm.), Master of Urban and Regional Planning (M
of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care
Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration
(D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.) and
Master of Arts (M.A.), Master of Science in International Affairs (M.S.I.A.)



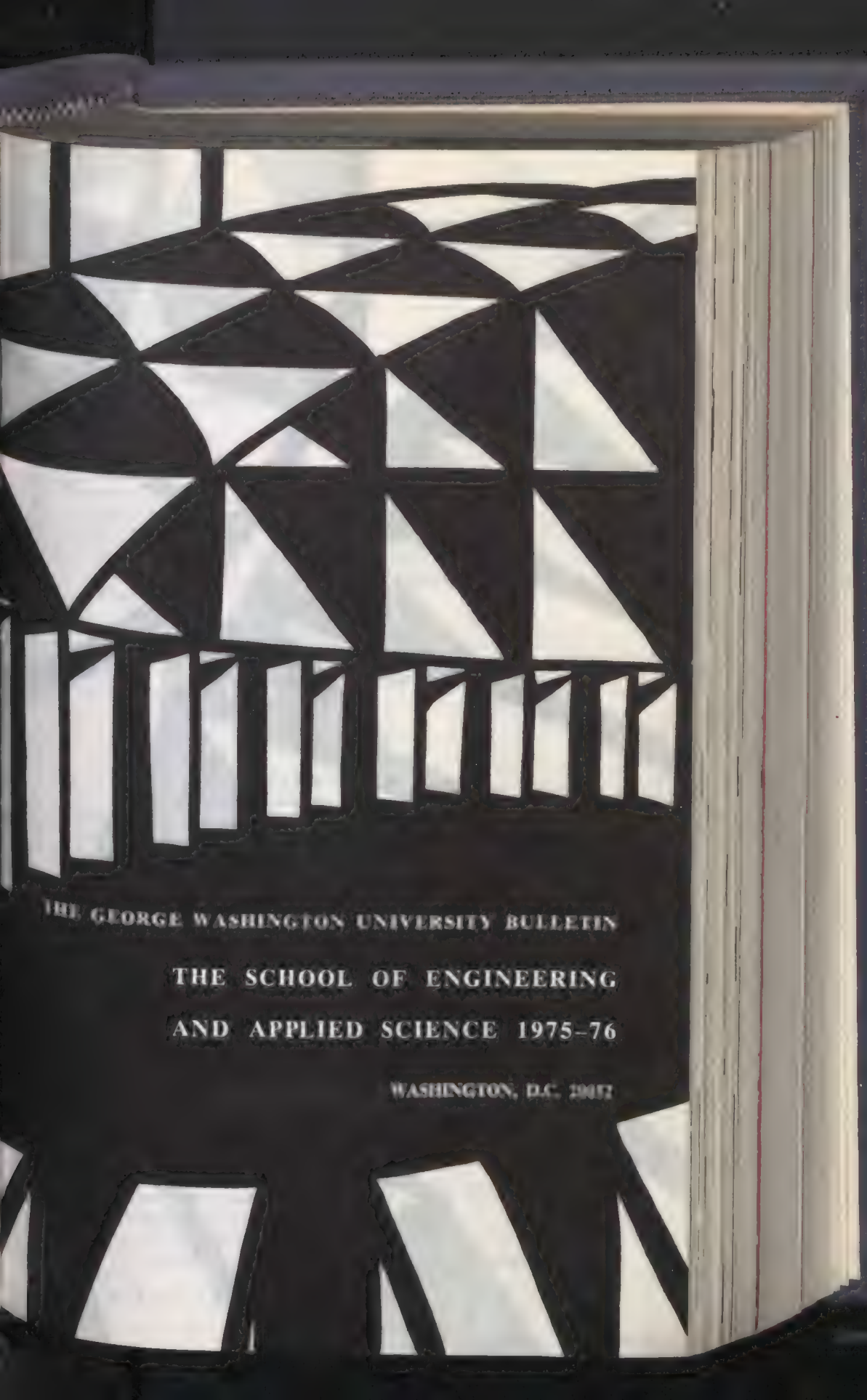


THE GEORGE WASHINGTON UNIVERSITY BULLETIN
Volume LXXIV, Number 5, May, 1975

Published by the University at Washington, D.C. 20052
MONTHLY: DECEMBER, JUNE
(2 ISSUES IN MAY, 3 ISSUES IN MARCH, JULY)

Second Class Postage Paid at Washington, D.C.





THE GEORGE WASHINGTON UNIVERSITY BULLETIN

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE 1975–76

WASHINGTON, D.C. 20052



CONTENTS

Page	
4	The Calendar
7	Message from the Dean
8	The Study of Engineering
11	The School of Engineering and Applied Science
12	Undergraduate Study
23	Graduate Study
31	Special Programs
42	Administration
43	Advisory Council
44	Programs of Study and Courses of Instruction
45	Applied Science Courses
50	Civil, Mechanical, and Environmental Engineering
50	Civil Engineering—Undergraduate Study
58	Mechanical Engineering—Undergraduate Study
65	Graduate Study
78	Civil Engineering Courses
83	Mechanical Engineering Courses
93	Engineering Science Courses
104	Electrical Engineering and Computer Science
104	Undergraduate Study
108	Electrical Engineering Courses
113	Computer Science Courses
115	Graduate Study
118	Electrical Engineering Courses
127	Computer Science Courses
136	Engineering Administration
150	Operations Research
158	Required Courses in Engineering Undergraduate Curricula Offered by Columbian College of Arts and Sciences
160	General Information
160	Registration
161	Fees and Financial Regulations
166	Financial Aid
170	Prizes
170	Regulations
174	Consortium of Universities of the Washington Metropolitan Area, Inc.
175	University Computer Center
176	The Speech and Hearing Clinic
176	The Reading Center
176	Veterans Education
177	Alumni Associations
179	Student Life
188	The University
188	History and Organization
189	The University Libraries
190	The Board of Trustees
191	Officers of Administration
192	The School of Engineering and Applied Science Faculty and Staff of Instruction
203	Appendix: Recently Established Regulations
207	Index

THE CALENDAR 1975–76*

1975 FALL SEMESTER

August 25	Orientation for students from foreign countries *Monday*
August 26	Orientation and placement tests for entering students *Tuesday*
August 27	Advising for all students *Wednesday*
August 28–30	Registration—Tompkins Hall of Engineering *Thursday–Saturday*
	Application for February graduation due as part of registration
September 1	Labor Day (holiday) *Monday*
September 2	Classes begin *Tuesday*
November 1	Deadline for submission of spring semester financial aid *Saturday*
November 18	D.Sc. dissertations of February candidates due *Tuesday*
November 26	Thanksgiving recess begins after last class *Wednesday*
December 1	Classes resume *Monday*
December 1	Master's theses of February candidates due *Monday*
December 2	Last day of fall-semester classes *Tuesday*
December 8–17	Examination period *Monday–Wednesday*

1976 SPRING SEMESTER

January 12	Orientation for students from foreign countries *Monday*
January 13–14	Advising for all students *Tuesday–Wednesday*
January 15–17	Registration—Tompkins Hall of Engineering *Thursday–Saturday*
	Application for May graduation due as part of registration
January 19	Spring-semester classes begin *Monday*
February 1	Deadline for submission of 1976–77 freshman financial aid applications *Sunday*
February 16	Winter Convocation (holiday) *Monday*
March 1	Deadline for submission of 1976–77 continuing and transfer undergraduate financial aid application *Monday*
March 13	Spring recess begins after last class *Saturday*
March 22	Classes resume *Monday*
March 23	D.Sc. dissertations of May candidates due *Tuesday*
April 1	Deadline for submission of 1976–77 graduate financial aid application *Thursday*
April 9	Master's theses of May candidates due *Friday*
April 23	Last day of spring-semester classes *Friday*
April 29–May 8	Examination period *Thursday–Saturday*
May 1	Deadline for submission of Summer Sessions financial aid application *Saturday*
May 9	Commencement *Sunday*

* This calendar is subject to change.

1975

JULY

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

AUGUST

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SEPTEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

OCTOBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

NOVEMBER

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

DECEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

1976

JANUARY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

FEBRUARY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29						

MARCH

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

APRIL

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

MAY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

JUNE

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

JULY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

AUGUST

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

SEPTEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

OCTOBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

NOVEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

DECEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

TO ALL PROSPECTIVE STUDENTS:

The School of Engineering and Applied Science has been in continuous session since 1884, and offers programs of study leading to Bachelor's, Master's, and Doctor's degrees. Its prime objective is to educate the student so that he will have the precious asset of a well-trained mind which may be applied to the attainment of our many national objectives. In these changing times, it is necessary to search for quality. Students and faculty have the opportunity of assisting in the planning and implementation of educational programs. Examination is made periodically of the School's objectives and how they relate to those established by the Engineering Council for Professional Development (ECPD). Emphasis includes such items as the student's basic and advanced levels of education and his role in present and future society.

This catalogue describes the programs and requirements for undergraduate and graduate study in the School of Engineering and Applied Science and includes information on the Cooperative Education Program in Engineering and the Joint Institute for Acoustics and Flight Sciences (JIAFS).

The Cooperative Education Program in Engineering provides the undergraduate engineering student with the opportunity to obtain an enduring foundation in engineering education by combining academic learning with practical, first-hand experience in the student's chosen field of engineering. The student's earnings will help him pay for a major part of the cost of his education.

JIAFS was created by the joint efforts of the NASA-Langley Research Center and the School of Engineering and Applied Science. The education and research opportunities offered in the program combine the academic resources of George Washington University and the professional research resources and facilities of NASA-Langley Research Center to prepare qualified graduate students for careers in research, development, design, and teaching.

The School of Engineering and Applied Science is a professional school in a university comprised of eight degree-granting schools and colleges. The environment of the nation's capital is very favorable for the intellectual and cultural development of the student. The metropolitan Washington area contains the second largest concentration of research and development in the United States, and the engineering component of this activity is similarly extensive offering many employment opportunities to students after graduation.

The atmosphere of the School is one of serious-minded effort toward mature development. Being a small school, it recognizes the individual as the single most important element in the educational process. The student body, undergraduate and graduate, has a primary interest in design, research, development, and management in both scientific and engineering activities. Many alumni of the School are successfully engaged in all fields of engineering—in science, management, government, and education.

The philosophy of the School, which might be summarized as "education for creativity, not conformity," has through the years reflected the many subtle and profound changes in the engineering profession.

The faculty of the School and I look forward to a closer and more fruitful relationship with you. If you need additional information, please do not hesitate to call upon the Department Chairmen or me.

HAROLD LIEBOWITZ
Dean



THE STUDY OF ENGINEERING

THE MEANING OF ENGINEERING AND APPLIED SCIENCE

ENGINEERING IS A BROAD PROFESSION. Its responsibilities and activities extend into every aspect of industry and research, and into many fields of commerce and the arts. Engineers have faced and continue to face problems in the production and distribution of all types of manufactured products, including the design of mechanical, electrical, and chemical processes, of equipment and of plants in which such products are made; in the design and construction of an infinite variety of structures such as bridges, tunnels, harbors, and dams; in aircraft design and construction, including complicated electronic equipment for control, guidance, and communication; in the operation of transportation systems; in the wide spectrum of activities existing in the automotive industry; in the missile and space programs; in the generation and transmission of power; in the modern phases of communication; in the control of traffic; in city planning; in public health and sanitation as it affects the environment; in energy resources and power; and in ventilation and refrigeration. This list of applications is far from exhaustive; it does indicate, however, that engineering is a broad profession in which there are many specialists.

THE RELATIONSHIP OF ENGINEERING AND SCIENCE

In any discussion of engineering and applied science, it is important to emphasize the distinction between engineering and science. The President's Scientific Advisory Committee points out that the engineer and scientist each play an important role on a team. "The scientist is one who seeks to extend the boundaries of knowledge in his chosen field. The engineer has the task of combining the knowledge of science with his knowledge and awareness of the needs and limitations of human beings and of a human society to develop and create things for human use. . . . While scientists have uncovered the basic knowledge, it is the engineers who have created the tangible tools, materials, and products that have revolutionized our daily lives, our community living, and our national defense."

The work of engineers is a focal point at which scientific knowledge, the use of such knowledge as a service to society, financial material, human resources, and society's needs are interrelated. The engineer is concerned, therefore, with the means for operating a dynamic society. He must consider not only whether the knowledge that exists will enable him to create a workable product, but also how the product can be built, who will use it, and how such use will affect the environment in which it will operate.

THE PROFESSIONAL ENGINEER

Engineers are concerned with the quality and preservation of human life. Engineer, as the term is used in this catalogue and as it is commonly understood in our society, refers to the person who makes use of the advances of science and technology in an economically feasible manner for the benefit of society. This process is complex and challenging. Although the content of engineering curricula is certainly scientific, the engineer has not lost his sense of purpose in serving as an intellectual agent in the practical world. This responsibility of the engineer arises from the breadth of the implications of engineering for the whole of society as well as from the depth of the requirements for competence. Technology has radically rearranged human life in our time. There are many who believe that, although the threshold of space has been crossed, the union of medical and engineering practice has been achieved, and breakthroughs have been made in other areas, this impact of engineering on modern life is just a modest preview of the engineering of tomorrow.

ENGINEERING EDUCATION AND THE STUDENT

Rapidly changing and advancing engineering activity requires an education for the future based on fundamental principles of science useful in applications to a dynamic, advanced society. In the fields of engineering and applied science there is no substitute for demonstrated ability and competence to solve the problems faced. Without question, achievement in particular courses of study is important. Equally important, however, is the ability to analyze and interpret all the aspects of a problem, to formulate solutions, and to evaluate those solutions in the light of all available information. The attainment of this objective is the basis for undergraduate education. The undergraduate program of the School of Engineering and Applied Science is subjected to periodic evaluation and appraisal by the faculty.

The curricula of the School of Engineering and Applied Science are founded on one basic principle—to assist the student in preparing for a career in engineering and applied science. This philosophy requires that the student master the principles on which future practice will be based and that he receive an education centered on that meaningful junction between theory and practice so that throughout his professional life he can follow the many interests and opportunities that may develop.

It should not be assumed, however, that only the intellectual elite should consider the study of engineering and applied science. Engineering, like medicine, law, education, science, history, government, and other disciplines, requires scholars. But in any of these areas, even though the prospective student has not achieved high scholastic standing, if he is genuinely interested in the subject, he can probably find a place for himself. Those who are mod-

erately well-endowed with mental ability and who are interested and willing to work will find in engineering and applied science a rich and varied field of study which can lead to satisfaction and success. It is difficult to make generalizations in this area, but if a student has demonstrated an aptitude for mathematics, science, and English, he will probably find the work of engineers and the study of engineering and applied science satisfying and challenging. Innate intellectual curiosity and the desire to learn and to work hard are good indicators of success. College Board examinations may reveal the capacity to manage further study in mathematics and science and their applications to engineering. No school or college can "give" an education. It can offer only the opportunity to "get" an education. The George Washington University's School of Engineering and Applied Science is a small school which provides an opportunity for close liaison with faculty members, as well as the opportunity to participate in matters of student concern—in organizations, and through other student activities. The School recognizes the individual as the most important element in the educational process.



THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE

HISTORY

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE was organized October 1, 1884, as the Corcoran Scientific School of Columbian University and was situated in the University Building then at 15th and H Streets, N.W. The School was named in honor of William W. Corcoran, Trustee and President of the Corporation from 1869 to 1888. Day and evening courses were offered in Literature, Science, and Technology and led to the degrees of Bachelor of Science, Civil Engineer, Mechanical Engineer, and Mining Engineer. The School was among the first to accept women for degree candidacy in engineering.

In 1903 the Corcoran Scientific School, the School of Graduate Studies, and the Columbian College were merged into a single Department of Arts and Sciences. Engineering degrees were made graduate.

Administrative changes led to The Washington College of Engineering being initiated in 1905 as one of the several semi-independent undergraduate colleges of the University, each with its own Board of Trustees. The College provided instruction leading to undergraduate degrees in engineering and architecture.

In 1909 the name of the College was changed to the College of Engineering and Mechanic Arts, and the curricula were revised to give the student a thorough understanding of the theory underlying engineering practice. Emphasis was placed on the development of a knowledge of scientific principles upon which the student could build and by which he might solve new problems as they are met in practice.

The name of the School was changed again in 1914 to the College of Engineering and later to the School of Engineering. Architecture was dropped from the curriculum, and degrees were limited to the field of engineering. However, the primary emphasis upon principles rather than technology which had characterized the School since 1903 was continued and has remained to this day as one of the important distinguishing features of the School.

In 1962 the name of the School became the School of Engineering and Applied Science.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The curricula in Civil Engineering, Electrical Engineering, and Mechanical Engineering are accredited by the Engineers' Council for Professional Development.

Undergraduate Study

THE UNDERGRADUATE PROGRAM is intended to provide a solid foundation in the basic principles, concepts, and techniques underlying engineering and applied science, on which the individual may build technical competence in a variety of areas as his professional career develops. It is preparation for a career in engineering or applied science, as it exists today and as it may develop in the future.

Undergraduate study is the formal beginning of a life-long continuing program of education. The School provides an environment that encourages and fosters the attitudes and disciplines essential to professional growth. The graduate, when he receives his Bachelor's degree, is prepared for productive work in his chosen field; he is also prepared for further development and progress, both formal and informal. The undergraduate curricula include courses in the humanities and social sciences to the extent necessary to develop a reasonable understanding and appreciation of these areas of knowledge.

Admission to the engineering program indicates that the student possesses at least minimum preparation and the probable capacity to meet the academic demands of this School. Since the School cannot predict either the student's response to the demands made on him or the program he should follow for his most effective development, the undergraduate program has been designed to offer a variety of experiences through which the student may find his own best path to maturity and growth in educational development.

The School is a place for learning; for experiencing adventures of the mind and of the hands; for the formulation, exchange, and exploration of ideas. During his undergraduate years the student is led to strengthen his skills in analysis and his talent for creative activity, through liberal use of project-type laboratory work. Independent thought and original ideas receive higher evaluation, in the appraisal of student achievements, than the rote recital of information.

To provide the undergraduate engineering student with the opportunity to obtain an enduring foundation in engineering education by combining academic learning with relevant, real-world employment which provides practical, first-hand experience in his chosen field of engineering, the School of Engineering and Applied Science has a Cooperative Education Program in Engineering in which arrangements have been made with leading industrial and governmental organizations for student employment at prevailing salary rates. Every effort is made to place the student in positions of employment that provide the best possible engineering experience consistent with his career plans. These work periods provide the student with income that may enable him to finance the

major portion of his tuition and other expenses. Entering freshmen, as well as transfer students from community colleges whose completed work is equivalent to requirements in this program, can be admitted to the Cooperative Education Program in Engineering.

ADMISSION TO UNDERGRADUATE STUDY

The School admits those applicants who can benefit themselves and society by disciplined intellectual effort in its environment. In the selection process, there is no discrimination because of sex, race, color, religion, or national origin.

Admission is the first selective step in a long series of qualifying steps the student will take in his progress toward professional competence in engineering. It indicates the School's belief that the applicant has at least the minimum preparation and ability to complete the curriculum successfully.

The applicant must be of good character and must have an academic background appropriate for the program of studies contemplated.

APPLICATION FOR ADMISSION

An applicant for admission obtains from the Office of Admissions of the University an application blank which he must fill out completely and return with the $10* application fee.

STUDENTS FROM U. S. INSTITUTIONS

Records presented become the property of the University and *cannot* be returned.

FRESHMAN ADMISSION

Consideration for admission is based on the following:

1. An acceptable certificate of graduation from an accredited high school showing at least 15 units†;
2. The principal's statement that the applicant is prepared to undertake college work;
3. Scores on the following College Entrance Examination Board tests: the Scholastic Aptitude Test and the English Composition Achievement Test.

The qualifications of applicants who, because of unusual circumstances, do not meet the above requirements will be considered by the School, which may prescribe admission tests.

Nine and one-half of the 15 units required for entrance must be distributed as follows: three in English, two in algebra, one in plane geometry, one-half in plane trigonometry, one in physics or chemistry, and two in one foreign language or history. General science may *not* be counted in satisfaction of the science requirement but may be counted as an elective unit.

---

* Application fee must be by check or postal money order, payable to George Washington University. The application fee is waived for a student applying for readmission who was registered in a degree program at the time of his last registration at this University and has not since registered at another institution.

† A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods of prepared classroom work.

It is recommended that *both* physics and chemistry be studied in high school. A high school course in solid geometry is recommended as a firm foundation for college mathematics.

An applicant must arrange to have sent directly *from his school to the Office of Admissions* the academic record of his first seven terms in secondary school, together with a personal evaluation and recommendation from his principal. This information may be supplied on a form provided by the University or on a standard form used by the secondary school provided all essential information is included.

Quantitative Deficiency.—A graduate of an approved high school who lacks not more than two units of the required subjects and who presents 15 acceptable units may be admitted to a prescribed program which includes courses to make up his deficiencies.

Applicants who wish to begin study in the fall semester should formulate plans early in the senior high school year. Although the University prefers to have applications submitted during the fall semester of the senior high school year, applications may be submitted until March 1. Students graduating at midterm wishing to begin study in the spring semester *should* apply no later than December 1. Applications and all required credentials of students wishing to begin study in either the first or second term of the summer session must be received prior to March 1.

Although decisions on most applications for the fall semester will require submission of seventh-term grades and senior-year test scores, an earlier decision will be given after September 1 to a student whose application becomes complete with a secondary school record through the junior year and junior-year test scores, provided these records clearly establish admissibility.

Early Admission Plan.—Unusually well-prepared students who have completed the junior year in high school may be considered for admission if they submit special credentials and have the unqualified recommendation of their principal or counselor. Inquiries should specifically mention the Early Admission Plan.

TRANSFER STUDENTS

Transfer students from other institutions (see page 21 for minimum residence requirement) should submit application and required credentials prior to June 1 for the fall semester, December 1 for the spring semester, May 1 for the summer sessions.

The transfer student must be in good standing as to scholarship and conduct. He must be eligible to return to the last previously attended institution in the semester for which he seeks admission to this University.

An applicant who has attended one or more institutions of higher learning must request *each* registrar to mail directly *to the Office of Admissions of the University* a transcript of his record, *even though credits were not earned.*

If high school units are not shown on the college transcript and if an applicant has fewer than 30 semester hours of acceptable work (*C* or better on academic work from an accredited institution), he must request that his high school record and College Examination Board Test scores be sent to the Office of Admissions. Applicants with marginal records of 30 semester hours or more of work are requested to submit high school records and the College Entrance Examination Board Test scores.

STUDENTS FROM FOREIGN INSTITUTIONS

Application, required records, and scores on the *Test of English as a Foreign Language* (see below) must be received from all *foreign applicants* no later than March 1 for the fall semester and November 1 for the spring semester.

REQUIRED RECORDS

Applicants must request all educational institutions attended to send directly to the Office of Admissions of the University official credentials listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from secondary schools and all colleges and universities attended are required. Records of state examinations and certificates are also needed. All records become the property of the University and *cannot* be returned.

LANGUAGE TEST

Students whose native tongue is not English should take the Test of English as a Foreign Language (TOEFL) or the ALIGU test (American Language Institute, Georgetown University). Students are responsible for making arrangements for taking these tests. Foreign students abroad should consult with the nearest U.S. Embassy for information on arrangements for taking ALIGU. Those interested in TOEFL should address inquiries to: TOEFL, Educational Testing Service, Princeton, New Jersey 08540, U.S.A. The completed application form should be returned to the Testing Service at Princeton well in advance of the beginning of the semester for which the applicant seeks admission. The test fee, which should be remitted with the application, entitles the student to have his test score sent to three different institutions. Registration for the *Test of English as a Foreign Language* does not constitute application for admission to George Washington University.

The Bulletin of Information, obtainable without charge, contains a description of the test as well as rules regarding application, fees, reports, and the conduct of the test; lists of examination centers; examination dates; and application blank. On the application for the test, the student should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20052.

In addition to the TOEFL or ALIGU, an admitted student may be required to report to the Admissions Office to make arrangements for taking an English Placement Test for foreign students prior to registration. Results of this test will determine the courses for which the student will be permitted to register in his program of study.

The University offers a comprehensive English-language program for foreign students. Since it is not a full-time program of study, a student must have sufficient knowledge of the English language to take at least one academic course along with his program in English to qualify for an Application for Student Visa (I-20) form from this University.

SPECIAL ENGLISH COURSES FOR INTERNATIONAL STUDENTS

The extensive experience of the Department of English with the language needs of international students has been synthesized into a comprehensive English Language Program that includes the following courses:

1. *An intensive introductory grammar course* in which basic reading and vo-

cabulary skills are introduced with the use of specially adapted materials. Intensive laboratory work is emphasized.

2. *A semi-intensive intermediate grammar review course* with a reading and vocabulary component consisting of specially adapted materials. The course offers three monitored laboratory hours and students are encouraged to do further laboratory work during the library hours of the language laboratory.

3. *An advanced grammar review course* with a reading and vocabulary component consisting of readings in 20th century American prose and interpretation of current newspaper reporting. Supplementary laboratory materials on grammar, reading, and pronunciation are also made available.

4. *A low or high intermediate level conversation course* focusing on dialogues, idiom drills, props, and situationally oriented conversation to develop oral fluency. There are three sections of the conversation course for different levels of English proficiency.

5. *A composition course* for international students who show a high degree of academic proficiency. The aim of the course is to develop writing skills and to foster an understanding of the techniques of exposition. The course requires a writing assignment each week and a 20- to 25-page term paper. The latter project includes studies in the use of the library and in information retrieval.

6. *A reading improvement course* emphasizes improvement of vocabulary, speed and comprehension, and study skills. Instruction in this seven and one-half week reading course, which is offered by the University Reading Center, is conducted both tutorially and in groups. Extensive use is made of the latest testing methods and mechanical aids, such as the tachistoscope, rate accelerator, and controlled reader.

7. *Workshop in technical and scientific English.* This workshop will focus upon the specialized English language needs of those international students who are concentrating in engineering and applied science.

The language laboratory is available to all students in the English Language Program. The laboratory contains a library of tapes that accompany the printed texts and a variety of listening and recording equipment, including individual recording and playback equipment.

Admission to a particular English class is determined by a suitable series of objective and nonobjective tests.

The English Language Program is offered in cooperation with the Department of English, Professor G.E. McCandlish, Chairman, and Assistant Professor G.R. Bozzini, Director, Division of English for International Students.

READMISSION

A student previously registered in the University who was not registered on campus during the immediately preceding semester must apply for readmission. Final dates for applying are the same as those for "Transfer Students," see page 14. If the student applies for a degree program and was previously registered as a nondegree student, or if he has attended one or more higher institutions during his absence from the University, he must have complete, official transcripts sent to the Office of Admissions from each institution attended before his application will be considered. Applications for readmission are considered on the basis of regulations currently effective.

The application fee is waived for a student applying for readmission who

was registered in a degree program at the time of his last registration at this University and who has not registered at another institution since his last registration at this University.

ADVANCED TUITION DEPOSIT

Upon notification of acceptance, a $100 advanced tuition deposit will be required of all full-time students including those readmitted. The deposit is credited toward tuition and is not refundable.

ADVANCED STANDING

CREDIT FOR ADVANCED PLACEMENT EXAMINATIONS

Advanced standing may be granted for study at the collegiate level in advanced courses in an approved secondary school, if substantiated by satisfactory performance in the appropriate Advanced Placement Examination of the College Entrance Examination Board. Advanced standing may also be granted for satisfactory performance in the College-Level Examination Program (CLEP).

(CLEP offers two types of examinations: General and Subject Examinations. CLEP General Examinations are offered in five areas: mathematics, social sciences, humanities, natural sciences, and English composition. CLEP Subject Examinations measure achievement of specific college-level courses and are offered in more than 20 subjects.)

Upon admission to degree candidacy, credit is assigned for the General Examinations, with the exception of the English composition examination, passed at the 50th percentile or above (college sophomore norms). Credit is assigned for the Subject Examinations passed at the level recommended in the College Board model policy. A candidate for a degree at this University must seek departmental approval prior to taking the examination to receive credit for a CLEP Subject Examination. Credit may not be earned by passing the examination after having taken the equivalent course. Arrangements for the examinations are the responsibility of the applicant and should be made with the College Entrance Examination Board College-Level Examination Program, Box 592, Princeton, N.J. 08540.

The applicant must request the examining service to submit the test papers and scores to the Office of Admissions. Consideration is given to both the quality of performance on the examination and the quality and content of the course of study completed by the applicant. Credit may be withheld pending satisfactory completion of higher-level courses in the same field.

Total credit that may be so granted is up to 30 semester hours, not more than 8 semester hours of which may be in any one examination area.

CREDIT FROM HIGHER INSTITUTIONS

Advanced standing (see page 21 for minimum residence requirement) may be granted for work successfully completed at an accredited institution of higher learning. Credit will be granted for transferred work only when it meets the requirements for the degree sought at this University. Only work of a grade *C* or higher will be considered for transfer.

CREDIT FROM TECHNICAL INSTITUTES

Advanced standing may be granted for work successfully completed at technical institutes. Credit will be granted for transferred work only when the applicant passes successfully the required validation examination. Arrangement for the examination should be made with the appropriate Department of the School. In any event, no more than 30 semester hours of credit for technical work will be granted in transfer for those who graduated from a two-year technical institute. A maximum of 60 semester hours of credit for technical work may be granted in transfer for those who graduated from a four-year technical institute.

SERVICE SCHOOL CREDIT

A limited amount of credit earned in service schools since 1941 may be considered for assignment to qualified degree candidates in the School of Engineering and Applied Science. Veterans should submit to the Office of Admissions photostatic copies of their service school records, indicating courses successfully completed with sufficient identification of the course to locate it in the *Guide to Evaluation of Educational Experience in the Armed Forces.*

CREDIT EARNED THROUGH UNITED STATES ARMED FORCES INSTITUTE (USAFI)

Credit is assigned for approved United States Armed Forces Institute college-level examinations passed with satisfactory scores.

REGULATIONS

Regulations regarding REGISTRATION, FEES, AND FINANCES *are stated on pages 160–166; other University regulations, on pages 170–174.*

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. He may attend only those classes for which he is registered. Regular attendance is required. A student may be dropped from any course for undue absence.

A student suspended for any reason may not attend classes during the period of suspension.

The student is expected to attend every meeting of the course in which he is registered, fully prepared to carry on the work required. The student is held responsible for all work in the course, and all absences must be excused before provision will be made for him to make up the work missed. Excuses for absences from examinations which have been announced in advance can be obtained only by written application to the instructor in charge of the course.

ACADEMIC WORK LOAD

A full-time undergraduate student who is not on probation may register for no more than 20 semester hours. A student employed more than 24 hours a week

who is not on probation may take no more than 10 semester hours. In exceptional cases these limits may be exceeded with the Dean's permission.

A student previously unemployed who accepts employment after registration must immediately report that fact to the Dean so that his schedule may be adjusted if necessary.

ADVISORY SYSTEM

The School of Engineering and Applied Science encourages a close faculty-student relationship. Every entering undergraduate student is assigned a permanent faculty adviser to assist him in orienting himself in the professional discipline. Faculty advisers counsel students on their programs of study, the achievement and maintenance of satisfactory scholastic performances, professional development, and extracurricular activity as part of the educational process. The adviser represents the student in all cases requiring faculty action.

Students must obtain their advisers' approval of programs of study prior to registration. Until a student has completed the work required for the degree he must consult his adviser in all academic matters. However, an adviser may not deny a student entry into any course or activity to which he is entitled under the regulations of the School.

All students are encouraged to discuss college problems with their advisers or instructors at any time; and parents or guardians are invited to consult with the Dean, Department Chairman, and advisers concerning any student problems.

Faculty advisers discharge their counseling duties in accordance with the high principles of their professional responsibility; however, the final responsibility for a student's action lies wholly with the student.

SCHOLARSHIP

For scholarship requirements for graduation, see "Graduation Requirements," page 21.

Grades.—Grades are mailed to the student through the Office of the Registrar at the close of each semester.

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Satisfactory; *D*, Low Passing; *F*, Failing. Whenever a grade has not been assigned, the symbol *I* (Incomplete) or the symbol *W* (Authorized Withdrawal) is recorded.

At the option of the instructor, the grade of *I* (Incomplete) may be recorded if a student, for reasons beyond his control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons. The reasons must be presented to the instructor before the last day of classes for the semester in which the course is given. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course which is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, he may initiate an appropriate grade change. Although the grade of *I may* remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work (usually the final examination or required paper) must be made up. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere. An *I* cannot be made up after the lapse of one calendar year.

Quality-point Index.—Scholastic standing is computed in terms of the quality-point index obtained by dividing the number of quality points by the number of semester hours for which the student registered.

Quality points are computed from grades as follows: *A*, four points; *B*, three points; *C*, two points; *D*, one point; *F*, no points, for each semester hour for which the student registered. Courses marked *W* or *I* are not considered in determining the index, except that courses marked *I* will be considered when a formal grade is recorded. Grades in courses at another institution are not considered in computing the quality-point index.

Mid-semester Warning.—At the end of the seventh week of each semester, instructors report to the Dean the names of students whose scholarship is unsatisfactory. On receipt of a warning notice the student must consult his instructor and his adviser immediately.

The adviser may prescribe diagnostic tests and/or remedial study to be completed before the end of the current semester.

Probation.—A full-time student (one taking 12 semester hours or more) whose quality-point index based on all courses attempted in his most recent semester falls below 2.00 for that semester, or who receives two grades of more of *F* in one semester, will be placed on probation. A student enrolled for less than 12 semester hours during the fall or spring semester and a student enrolled during the summer sessions is subject to probation or suspension on the basis of his record for 12 semester hours, rather than on his record in any one semester. The probation period is for one semester for full-time students, or the next 12 semester hours of study for part-time students.

If a student earns a quality-point index of at least 2.00 in all courses taken during the period of probation and receives no grade of *F* during this period, he is removed from probational status.

If a student fails to achieve a quality-point index of 2.00 for all courses completed during the probation period, he is continued on probation for an additional period of one semester or 12 semester hours of study.

Upon being placed on probation, a student must undertake the Engineering Student Probation Program of testing, counseling, and remedial work available at the Counseling Center. A student on probation is required to follow a program of study prescribed by his adviser and Department Chairman, and is not eligible to participate in student activities.

Suspension.—If a student receives two or more grades of *F* during a probation period he will be suspended. If a student fails to achieve a quality-point index of 2.00 in a second consecutive period of probation, he will be suspended. A student who has been on probation for three periods and who fails to achieve a quality-point index of 2.00 in the third period or any subsequent semester will be suspended.

DEAN'S HONORS LIST

The Faculty of the School recognizes meritorious scholastic achievement by a Dean's Honors List, containing the names of candidates for undergraduate degrees whose scholastic achievement satisfies all of the following requirements:

1. The student must have completed a minimum of 13 semester hours in one semester with a quality-point index of 3.00 or higher and with no more than one grade of *C*.

2. No grade below *C* may have been received during the qualifying period.
3. No disciplinary action may have been taken with respect to the student.

The Dean's Honors List is prepared at the end of the fall and spring semesters and displayed in an appropriate public place in the School. A notation is made on the student's record each time his name is included in the List.

USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the Dean. The Dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the Dean.

GRADUATION REQUIREMENTS

See page 172 for general requirements for graduation.

RESIDENCE

A minimum of 30 semester hours must be completed in residence. Summer work may be counted. Unless special permission is granted by the Dean to study elsewhere, the work of the final year must be completed in residence.

SCHOLARSHIP

To be eligible for graduation a student must have a quality-point index of at least 2.20 in those technical courses specified in the fifth through the eighth semester of his curriculum.

HONORS

With Distinction.—A Bachelor's degree may be conferred "With Distinction," at the discretion of the Faculty, if a student attains a quality-point index of 3.50 or higher on all work taken at this institution. To be eligible for this honor a student must have completed at this institution at least one-half of the work required for the degree.

Special Honors.—A Bachelor's degree may be conferred with "Special Honors," at the discretion of the Faculty, for outstanding achievement in the student's senior year work on recommendation of the Faculty, under the following regulations:

1. The student must have his candidacy for Special Honors approved by the department chairman representing his major field not later than the beginning of his senior year.
2. The student must meet such other conditions as may be set at the time his candidacy is approved.
3. No student will be awarded Special Honors unless he has a quality-point index of at least 3.00 on all work taken at this institution.
4. To be eligible for Special Honors a student must have completed at this institution at least one-half of the work required for the degree.

UNDERGRADUATE CURRICULA

The four-year undergraduate curricula lead to the degree of Bachelor of Science, with parenthetic designation of the major; for example, Bachelor of Science (Electrical Engineering). Students who are deficient in preparation require a longer period; those who are admitted with advanced standing or who attend summer sessions can complete the requirements in less time.

The program of the first four semesters (2 years) is common to all curricula and provides the essential broad base of scientific principles and mathematical techniques necessary for the professional courses of the last four semesters, together with an appropriate background in the humanities and social sciences (see below).

A minimum total of 130 semester hours is required to qualify for the degree. However, students are encouraged to elect additional course work above the required minimum to the extent that their interests and the School's offerings permit.

Degrees are offered in Civil Engineering, Electrical Engineering, and Mechanical Engineering, and each field provides an area of concentration in Computer Science. Students in Civil Engineering may also select an area of concentration in Environmental Civil Engineering; students in Mechanical Engineering may also select an area of concentration in Energy Resources and Power.

The student is assisted by his faculty adviser, who approves his program each semester prior to registration. For the guidance of the student and his adviser, every beginning student takes the School's placement examinations in English, reading, algebra, and trigonometry and, if deficient in any of these areas, must take remedial work in the area of deficiency.

COURSES IN THE HUMANITIES AND SOCIAL SCIENCES

The basic purpose of a program in the humanities and social sciences for engineering students is to assist the student in acquiring knowledge which will permit him to understand the social and humanistic elements of the past and present and to analyze the problems facing his society today. The ultimate goal is to help the engineer have a better understanding of his society and an appreciation of his role and responsibilities within it.

Since the education of an engineering student is, by necessity, oriented toward technical subjects, his program in the humanities and social sciences should not emphasize technical aspects and skills, but should rather consist of courses which can broaden his outlook. As a consequence, courses in subjects such as accounting, finance, industrial management, introductory languages, and personnel administration should not be included in the humanities and social sciences program. On the other hand, courses in areas such as anthropology, economics, fine arts, geography, history, literature, philosophy, political science, psychology, and sociology are considered appropriate.

Each engineering student is required to prepare, with the assistance of his faculty adviser, a program of courses in the humanities and social sciences, explaining how his program meets the purpose stated above. The student's program must include a minimum of 18 semester hours and must be approved by both his adviser and department chairman.

Graduate Study

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE offers graduate study leading to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science.

In its graduate programs, the School, as it does in undergraduate study, adheres to the educational philosophy of increasing the knowledge and understanding of the individual student by concentration on principles and their application rather than by encyclopedic coverage of techniques and specialized detail. Each program is individually planned according to the student's preparation and needs.

Graduate study may be undertaken in any field of engineering or applied science in which the School has adequate facilities and resources. Upon approval, the student may select courses in other departments of instruction in the University to serve specific needs or objectives. A complete list of available fields and areas of concentration is included under each departmental listing in the "Programs of Study and Courses of Instruction" section of this catalogue (pages 44–159).

THE MASTER'S PROGRAMS

The student's program may provide for broad coverage in a variety of fields or may be designed to provide a concentration in particular areas. The minimum program consists of 24 semester hours of approved graduate courses and a Master's thesis (equivalent to 6 semester hours). With the approval of the department the student may elect an optional program without a thesis which consists of a minimum of 33 semester hours of approved graduate courses. All Master's candidates are required to pass a Master's Comprehensive Examination. Students whose undergraduate study does not include necessary prerequisites may be required to take more than the minimum semester hours required.

Upon admission the student is assigned an adviser. Programs of study are determined by any prerequisites established and the requirements of the department in which the student wishes to study. The program of studies in preparation for the Master's Comprehensive Examination must be approved by the student's adviser and the appropriate department chairman.

ADMISSION

Admission to graduate study toward a Master's degree requires an appropriate Bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, as indicated by undergraduate grades, Graduate Record Examination scores, and similar data.

An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate courses as an unclassified student before being admitted to graduate student status. In some cases, if such deficiencies are minimal, he may be admitted to graduate student status and allowed to take a limited number of graduate courses while completing the undergraduate courses in which he is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the Master's degree.

For additional admissions requirements for the degrees of Master of Engineering Administration and Master of Science in the Department of Engineering Administration, see pages 137; 140–141; for the degree of Master of Science in the Department of Operations Research, see page 150. Candidates for the degree of Master of Science in the Department of Electrical Engineering and Computer Science must have satisfied specific undergraduate requirements, depending upon the area of concentration. Students should consult the special brochure *The Graduate Programs of the Department of Electrical Engineering and Computer Science.*

ADMISSION PROCEDURE

Forms for application for admission are available at the School of Engineering and Applied Science. They must be submitted, together with the nonrefundable application fee of $25, to the Manager of Engineering Admissions, Room 100, Tompkins Hall of Engineering, George Washington University, Washington, D.C. 20052, no later than September 1 for the fall semester, December 15 for the spring semester, May 1 for the first summer session, and June 1 for the second summer session. The applicant must request each educational institution attended since high school graduation to send an official transcript of his record directly to the Manager of Engineering Admissions. Although not required, if the applicant has completed the Graduate Record Examination, he should request that his scores be sent to the School. The applicant will be notified by mail when a decision on his admission has been made. English language requirements for foreign students are contained on page 15.

All inquiries and correspondence relative to graduate admission should be directed to the Manager of Engineering Admissions.

TRANSFER CREDIT

Up to 6 semester hours of satisfactory credit (with grades of *A* or *B*), which normally must have been earned in a graduate program at another recognized institution, *may* be accepted in transfer, when applicable, to satisfy Master's degree requirements in this School. However, the student must, with the approval of his adviser, petition to the appropriate department chairman for such a transfer.

REGISTRATION

A graduate student may register for classes when he presents an official letter of admission or his Registration Card from the previous semester. No registration is accepted for less than a semester or one summer session.

Concurrent registration in this School and in another institution not a member of the Consortium of Universities of the Washington Metropolitan Area, Inc., or another division of this University requires the written permission of the Deans concerned, *prior to registration.* Allowance of credit for work done concurrently at another institution is at the discretion of the Dean.

Dates and hours of registration are stated in the Calendar, page 4, and in the *Schedule of Classes* published in advance of each semester.

MASTER'S THESIS

In those programs requiring a thesis, the degree candidate must submit an acceptable thesis to demonstrate his ability to make independent use of the knowl-

edge and discipline of thought acquired and developed by graduate study, to furnish objective evidence of constructive power in a given field, and to demonstrate that he can communicate the results of his work in writing. Work of a suitable character for which the student has professional responsibility may be considered, whether done on or off campus, provided no significant amount of work is completed without faculty supervision.

As a part of registration for the thesis course 299, the candidate must submit to the appropriate department chairman (on the form obtainable at the School office) his thesis area, approved by his faculty adviser. He must submit his thesis title to the Dean, on the form available in the School office, at the beginning of the semester in which he expects to graduate. Registration in thesis 299–300 entitles the student, during such registration, to the advice of the member of the faculty under whom the thesis is to be written. He may consult his adviser, but the thesis is the exclusive responsibility of the student.

The thesis in final form must be submitted to the appropriate department chairman by the date stated in the calendar for the semester in which the candidate enrolls in thesis 300. In case a thesis is unfinished on the date specified, the student will be granted an additional semester and must pay the "Continuous Registration" fee (see page 163) unless he is registered for course work. If the preparation of the thesis extends beyond the three semesters, approval for an extension of time will be required and the student must reregister for thesis 300 and pay tuition as for a repeated course. The over-all time limit for earning the degree (see page 27) may not be exceeded.

A thesis may be submitted in final form one time. The acceptability of the thesis is determined exclusively by the Master's Comprehensive Examination committee. If the thesis is unacceptable, the student's graduate status is terminated.

Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the School. Accepted theses, with accompanying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for circulation.

OPTIONAL MASTER'S PROGRAM WITHOUT A THESIS

With the approval of the department, a student may elect an optional program without a thesis which consists of a minimum of 33 semester hours of approved graduate courses.

MASTER'S COMPREHENSIVE EXAMINATION

The student must pass a Master's Comprehensive Examination, to demonstrate substantial understanding of principles and methods and their use in the area of his interest. This Examination may be written, oral, or both. A graduate student who fails any portion of the Master's Comprehensive Examination on his first attempt may be examined one more time if approval is given by the appropriate Examining Committee. In the event of failure to complete the Examination satisfactorily, the student's graduate status terminates.

REGULATIONS

Regulations regarding REGISTRATION, FEES, AND FINANCES *are stated on pages 160–166, other University regulations, on pages 170–174.*

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. He may attend only those classes for which he is registered. A student is expected to attend every meeting of the course in which he is registered, fully prepared to carry on the work required. A student may be dropped from any course for undue absence. Excused absences must be arranged with the instructor.

SCHOLARSHIP

Grades are indicated as *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; and *CR*, Credit for satisfactory thesis completion. Whenever a grade is not assigned, the symbol *I* (Incomplete) or the symbol *W* (Authorized Withdrawal) is recorded.

Pass-Fail Grading System.—All SEAS students who have a keen desire to advance their knowledge may take SEAS courses under the pass-fail grading system on the basis that the courses cannot be used toward any degree program at SEAS.

At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond his control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course which is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, he may initiate an appropriate grade change. Although the grade of *I* *may* remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work must be made up. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere. An incomplete which is not removed within one calendar year is automatically changed to an *F*.

A student may not repeat for credit a course in which he has received a grade of *C* or above, unless required to do so by the department concerned. A written statement requiring the student to repeat such a course for credit must be submitted to the Registrar by the appropriate department chairman.

For Master's work, a minimum of 24 semester hours (for those who receive credit for a thesis) or 33 semester hours (for those who follow the program without a thesis) of graduate course work with the grade of *B* or higher is required for graduation. Students who receive two grades of *F*, or (except those registered prior to and in continuous residence since the 1967 fall semester) three grades below *B*, are barred from further enrollment in graduate courses and, ordinarily, will not be readmitted to gradute study. Students who receive the grade of *C* in one or two courses are required to take additional course work to make up the minimum semester hours of work with grades of *B* (except those registered prior to and in continuous residence since the 1967 fall semester).

RESIDENCE

In general, a minimum of one year of full-time study, or the equivalent in part-time study, must be completed in the School.

TIME TO COMPLETE MASTER'S DEGREE REQUIREMENTS

A full-time student in the Master's program is allowed a maximum of three calendar years to complete all degree requirements, from the date of his first graduate-student status registration in prerequisite or graduate courses. A part-time student in the Master's program is allowed a maximum of five calendar years. The time limit does not include any period of registration as an unclassified student before admission to graduate student status, nor does it encompass any specified period spent on approved leave of absence. Readmission is required upon expiration of leave of absence under the conditions and requirements then prevailing.

Students who do not complete degree requirements within the allowed time have their graduate status terminated. They may be readmitted to graduate status under conditions specified by the department chairman and approved by the Dean.

THE DOCTORAL PROGRAM

The School of Engineering and Applied Science offers a program of advanced study and research leading to the degree of Doctor of Science. This program is limited to those fields in engineering or applied science in which a discipline has been established and for which the University has or can arrange adequate resources.

The doctoral program is designed to prepare the student for a career of creative scholarship by providing a broad but balanced background of knowledge and guidance in the performance of research. It requires study of interrelated fields of learning as well as original research in the field of central interest.

The program for the degree is divided into two stages. The first—made up of a study of interrelated fields of learning which supports the general area of research concentration—culminates in the qualifying examination. The second—composed of research investigation of a particular subject in a special field and the presentation of such research findings in a written dissertation—culminates in the final examination.

ADMISSION TO DOCTORAL STUDY

A satisfactory Master's degree from an accredited institution is required, together with acceptable personal qualities and a capacity for creative scholarship. Normally, a *B* average in graduate work is required. However, the minimum does not assure automatic acceptance; the departments may, and often do, set higher admission standards.

APPLICATION FOR ADMISSION

Forms for application for admission are available at the School of Engineering and Applied Science. They must be submitted, together with a nonrefundable

application fee of $25, to the Manager of Engineering Admissions, Room 100, Tompkins Hall of Engineering, George Washington University, Washington, D.C. 20052. The prospective doctoral student seeking admission should apply before June 1 for the fall semester and before December 1 for the spring semester. Personal interviews may then be arranged to discuss the applicant's qualifications and the possibilities for an effective doctoral program. The applicant must arrange for complete documentary records (transcripts) to be forwarded to the Manager of Engineering Admissions in sufficient time to permit assembly of complete records for evaluation as soon after the above application deadlines as possible.

The applicant must arrange for letters of recommendation to be submitted from two faculty members of the institution from which he received his Master's degree; one of these, if possible, should be from his Master's adviser. The letters should be addressed to the appropriate department chairman.

LANGUAGE REQUIREMENT

A doctoral student should maintain a broad outlook as he pursues his study, and therefore must have the capability of reading appropriate literature published in a foreign language. Accordingly, a reading knowledge of one foreign language, preferably Russian, must be demonstrated before admission to the qualifying examination. If the student wishes to satisfy this requirement with a language other than Russian, he must obtain the approval first of his doctoral adviser, then of his department chairman; permission to use a language other than Russian will be granted on the basis of its importance to the student's field of interest.

TOOL REQUIREMENT

In addition to the language requirement, an examination in a tool requirement (e.g., computer programming) may be established by the various departments.

STUDY FOR THE QUALIFYING EXAMINATION

Upon admission to the first stage of the program, i.e., study of interrelated fields culminating in the qualifying examination, the student is assigned a faculty adviser who directs his studies.* The adviser approves appropriate fields of study to insure the student's breadth of knowledge and to support research in his central field of interest, advises him concerning the scope and content of his fields of study, and guides him in preparing for the qualifying examination. Programs of study are normally structured to include a major field of study and two minor or supporting fields.

A minimum of 30 semester hours of credit in a formal program at the graduate level beyond Master's study is required. In many cases, particularly in those in which the student undertakes a doctoral program in a field other than that in which he obtained his Master's Degree, the program of studies exceeds 30 semester hours.

Students admitted to doctoral study are encouraged to undertake one year of

* In some departments, instead of a faculty adviser, a faculty committee may be appointed to approve programs, direct study, and carry out all other responsibilities of the faculty adviser.

full-time study on campus. In general, the adviser will require the student to register for a minimum of 6 semester hours of course work in every semester except the summer sessions.

TRANSFER OF CREDIT

Up to 6 semester hours of credit earned in courses completed with the grade of *A* or *B* while enrolled in a doctoral program at another accredited institution may be accepted in transfer to satisfy doctoral requirements of this School, subject to the approval of the student's adviser and his department chairman. Credit earned in courses completed more than five years prior to admission to the doctoral program will not be accepted in transfer, and some departments may require that transfer credit must have been earned within a shorter period of time before admission.

THE QUALIFYING EXAMINATION*

The purpose of the qualifying examination is to ascertain that the student's background and intellectual development are adequate to support doctoral research in his central field. Qualifying examinations may be written or oral, or both, and are scheduled over a period of several days. They are conducted only during the fall and spring semesters on dates established by the departments and are administered by a faculty committee. Upon favorable report of the examiners to the Dean through the appropriate department chairman, the student is admitted to candidacy for the degree; he then begins his specialized study and research under the supervision of a designated member of the faculty or, in special instances, an outstanding engineer/scientist who is not a member of the faculty.

The qualifying examination is the principal means used to determine the student's ability to qualify as a candidate for the doctoral degree and to enter the second stage of his program.

At the discretion of the committee which prepared the examination, the doctoral student may be given a second opportunity to qualify for candidacy in the event of failure in any part of the qualifying examination. In general, the entire qualifying examination must be retaken by the student in order to qualify for candidacy.

SCHOLARSHIP

To be admitted to the qualifying examination, the doctoral student must achieve an over-all academic average of 3.20 on a scale of 4 (a grade of *A* equals 4 points; *B*, 3 points; *C*, 2 points; and *F*, 0 points). No doctoral student may receive more than two course grades below *B*. If he does receive more than two course grades below *B*, his graduate study is terminated and his further enrollment prohibited. Courses in which the student earns grades below *B* are not included in his total semester-hour requirement for the degree. In the event a student receives any grade below *B*, he is required to consult with his adviser for a review of his program of study and discussion of possible changes therein.

* Some departments may administer a pre-qualifying examination prior to completion of the study program.

RESEARCH, DISSERTATION, FINAL EXAMINATION

The student admitted to candidacy for the degree of Doctor of Science request as Director of Research the member of the faculty under whom he wishes to conduct his research. The faculty member may accept or reject such request. The research area is approved by the Director. Throughout the remainder of the doctoral program the candidate works directly under his Director in his dissertation research. However, the student is not precluded from consulting with other members of the faculty, as may be required, on an informal basis, and may be encouraged to do so by his Director of Research. A committee of the faculty consisting of three members including the Director as chairman will advise in the final preparation of the dissertation. The department chairman appoints such a committee on the recommendation of the Director of Research. Work on the dissertation is equivalent to a minimum of 24 semester hours.

THE DISSERTATION

A dissertation is required as evidence of ability to perform original scholarly research and to present and interpret the results. The student is solely responsible for the content of his dissertation.

The aim of the student in this stage of his candidacy is the production of a dissertation which embodies the results of an extended study original in nature and which includes material deemed worthy of publication in recognized scientific and engineering journals. The student is expected to attempt to publish the results of his research as soon as possible after he receives his degree and to submit copies of the published material to the Dean. Credit must be given in the publication to the fact that the material is abstracted, summarized, developed, etc., from a dissertation submitted to George Washington University in partial fulfillment of the requirements for the Doctor of Science degree.

The candidate must submit to the appropriate department five complete copies of the dissertation and two original copies of an abstract (not to exceed 600 words) of his dissertation no later than the date specified in the calendar. One copy of the abstract is for inclusion in the announcement of the examination and one for reproduction by University Microfilms, Inc. One copy of the dissertation is also sent to University Microfilms, Inc.

Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available at the School Office. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee to cover a part of the expense of printing the abstract of his dissertation, and for the basic service rendered by University Microfilms, Inc. Accepted dissertations, with accompanying drawings, become the property of the University and are deposited in the University Library where bound copies are available for circulation.

THE FINAL EXAMINATION

Upon acceptance of the dissertation by the committee, consisting of the Director and two other faculty members of this School, which has assisted in supervising its final preparation, the candidate is presented for his final examination. The final examination is oral and is open to the public. The candidate must demonstrate a mastery of his special fields of study and of the materials and techniques used in the research. The committee of examiners will consist of

less than five members, three of whom must be members of the faculty on full-time service. The committee may include qualified experts brought to the University especially to participate in the examination. The Director of Research serves as Advocate for the candidate. When the candidate satisfies the examining committee of the high quality and originality of his contribution to knowledge as well as his mastery of the scholarship and research techniques of his field, the committee of examiners recommends him for the degree of Doctor of Science. The final examination is conducted only during the fall and spring semesters. The candidate should consult with the appropriate department chairman as to possible dates for the examination.

RESIDENCE AND CONTINUOUS STUDY

All the work for the degree must be done in residence (on the campus), except when special permission is granted by the chairman of the department. The student must maintain continuous registration in the School. Failure to do so breaks the student's registration, and he must apply for readmission to doctoral study under whatever conditions and regulations are in effect at that time. In case of incapacity or other legitimate reasons, the student may be granted a leave of absence of up to one year. Extension of such leave will require special request to and approval of the appropriate department chairman. During approved leave of absence, the student must maintain continuous registration. The time period for completion of all requirements for the degree will be adjusted on the basis of the approved leave of absence.

In general, one year of study is the minimum amount of time to be spent in preparation for the qualifying examination. The qualifying examination must be completed within five years of the date of admission, and the entire degree program must be completed within seven years. After admission the student may apply for his qualifying examination whenever he believes that he is properly prepared. A minimum of two years of full-time study and research should be expected in meeting the requirements for the degree.

Special Programs

INSTITUTE FOR THE STUDY OF FATIGUE, FRACTURE, AND STRUCTURAL RELIABILITY

THE INSTITUTE for the Study of Fatigue, Fracture, and Structural Reliability of the School of Engineering and Applied Science is under the technical direction of Dr. A.M. Freudenthal, an internationally recognized authority. The basic objective of the Institute is to develop an interdisciplinary approach to fatigue research through close cooperation of research workers from different fields. The Institute deals principally with the study of the physical mechanism of damage initiation, in order to establish principles for the rational design of metal alloys of superior fatigue performance on the one hand, and to develop advanced methods of fatigue design and reliability on the other. Because of the large volume, past and current, of straight fatigue testing of standard test specimens in industrial, government, and university laboratories, no testing of this type is generally conducted by the Institute. However, results of such tests appearing in publications and reports are carefully scrutinized for their significance in terms of the purposes of the Institute. In addition to advancing inter-

disciplinary research, the Institute provides specialized training for gradu students.

The Institute conducts seminars, issues technical reports, and supplies info mation, lectures, and consultations to many government and industrial resea and development laboratories.

INSTITUTE FOR MANAGEMENT SCIENCE AND ENGINEERING

The Institute for Management Science and Engineering defines and develo new management techniques required to keep pace with an ever-expandi technology. It provides a multidisciplinary environment for innovative gra ate teaching and substantial opportunities for research activities and pub service under diversified sources of external support. The principal academ fields directly involved are operations research, management science, and t computer sciences.

The programs of the Institute are concerned with important educational a public-service needs for conservation of national resources. Such progra require full-time interaction among students, faculty, and staff in ways po sible only at universities. Through its Program in Logistics, the Institute pe forms research leading to the development of a science of logistics featur principles and methodology for resource allocation problems in civil affairs a national defense efforts.

Participation by faculty members and graduate students from all scho in the University is encouraged as consistent with the multidisciplinary n jectives of the Institute. Graduate students are supported through resea assistantships with thesis and dissertation efforts ordinarily being the ma



work responsibilities. Reliance is also placed on staff research specialists, a there are special provisions for substantial contributions from distinguished v tors from government, private industry, and other universities.

The Institute disseminates its results through seminars, colloquia, conferenc and a special series of monographs. All research is unclassified.

THE GWU—NASA-LANGLEY GRADUATE PROGRAM

George Washington University, in cooperation with the National Aeronautics and Space Administration's Langley Research Center, has a full-resident graduate engineering program at NASA-Langley, in Hampton, Va., approximately 200 miles south of Washington, D.C.

The program is open to qualified NASA employees and area residents. Courses may also be taken by nondegree students, with the approval of the instructor. Students may be permitted to transfer a maximum of 6 semester hours of approved graduate course credit from other accredited institutions.

Courses in the program are taught by NASA scientists and engineers and the faculty of the School of Engineering and Applied Science. NASA-Langley's extensive scientific and engineering facilities and equipment are utilized whenever feasible.

The program at NASA-Langley leads to the degrees of Master of Science and (by special permission of the appropriate department chairman) Doctor of Science in the fields of acoustics, aerospace engineering (including options in aeronautics and astronautics), applied mechanics, structures and dynamics, computer science, electrical engineering, flight sciences, materials engineering, and mechanical engineering.

Information regarding this program may be obtained from John L. Whitesides, Jr., Coordinator, GWU-NASA Program, Mail Stop 69, NASA-Langley Research Center, Hampton, Va. 23365.



THE GWU—NASA-LANGLEY JOINT INSTITUTE FOR ACOUSTICS AND FLIGHT SCIENCES (JIAFS)

The National Aeronautics and Space Administration's Langley Research Cen- joined with George Washington University's School of Engineering and Appl Science in 1971 to create the Joint Institute for Acoustics and Flight Scienc This jointly operated Institute is dedicated to increasing the nation's resea and engineering capabilities in relevant technical fields such as acoust flight sciences, and structures and dynamics. The Institute, which is loca at the Langley Research Center, is dedicated to the advanced training of dents and professional engineers in the fields of acoustics, flight sciences, structures and dynamics, and other relevant areas, and serves to provide a ter for advanced research by bringing together researchers and scholars in these fields for the exchange of ideas and findings. It is also the purpose of Institute to provide the necessary facilities for qualified researchers and schol who want to engage in research work in these areas.

The organization of the Institute consists of a director, John E. Duberg, sociate Director of the NASA-Langley Research Center, and a co-direc Harold Liebowitz, Dean of the George Washington University's School Engineering and Applied Science.

JIAFS currently offers academic and research programs in the areas Acoustics, Flight Sciences, Structures and Dynamics, and Environmen Modeling. The objective of the program is to prepare qualified gradu students for careers in research, development, design, and teaching to m the challenges of ever-increasing technical problems and the nation's need these fields. The education and research opportunities offered in the progr combine the academic resources of George Washington University and the fessional research resources and facilities of NASA-Langley Research Cen These opportunities also enable students to involve themselves in resea projects that excite their interest and permit them to associate with promin visiting members who are working on related problems. Most of the fac and NASA scientists conduct research, and students are closely knit into intimate association of research and instruction from the day of their arr It is believed that the experience of the students during their stay at the NAS Langley Research Center will be highly rewarding and will benefit th throughout their future careers.

The current education and research programs are the following:

Acoustics Program.—The Acoustics program is concerned with the p lems of alleviating noise and with providing a technical base for design acceptable aircraft and space vehicles, noise-resistant structures, and gro transportation systems. Areas of current research interest include boundary layer noise, duct acoustics, jet noise, nonlinear problems in acoustics, s noise, structural response to noise, mechanical and acoustical coupling pr lems, and subjective response to noise and vibration.

Flight Sciences Program.—The Flight Sciences program deals with advan flight concepts of both CTOL and V/STOL aircraft, including areas of fli dynamics, instrumentation, guidance and control, aeroelasticity, and syst analysis. Specific research areas that are currently being investigated inc aerodynamic analysis of jet-augmented wings, stability and control of V/ST aircraft, analysis and flow visualization of wing-tip vortices, wind-tunnel

flight testing of V/STOL aircraft, stall-spin characteristics of aircraft, experimental evaluation of aircraft handling characteristics, and ride-quality control of STOL aircraft.

The Structures and Dynamics Program.—The Structures and Dynamics Program is designed to provide a basic understanding and a working knowledge of some key areas pertinent to structures, solid mechanics, and dynamics technology including computer-aided design. Areas of current research interest include solution techniques on fourth-generation computers; multidisciplinary and integrated design procedures; interactive graphics; nonlinear and dynamic problems; rotor dynamics; active control; mathematical programming; and other advanced structural design procedures.

The Environmental Modeling Program.—The Environmental Modeling Program is aimed at developing mathematical models which characterize the atmosphere for use in predicting pollutant distributions and transport, and for use in interpretation of satellite remote measurements of atmospheric constituents. Areas of research include direct and inverse techniques for the radiative transfer problem; effects of particulates on atmospheric chemistry and energy balance; role of chemistry, mass transport, and radiative transport in models of the stratosphere and troposphere.

The Materials Science Program.—The Materials Science Program is concerned with theoretical analysis and experimental verification of processes which degrade mechanical properties of metal-matrix composites; analysis of corrosion and stress-corrosion of materials in environments encountered by aerospace vehicles; analysis of creep and cyclic creep materials, based on both deterministic models and multiparameter regression; and prediction of mechanical properties of engineering alloys in terms of composition, processing conditions, and service history. Areas of current research interest include interfacial effects, stress corrosion, cyclic creep prediction, and mechanical property prediction.

Participating in these programs are Graduate Student Research Scholar Assistants, faculty from George Washington University, scientists and engineers from NASA-Langley, and visiting scientists and engineers.

A number of Research Scholar Assistantships are available to qualified students seeking an outstanding opportunity for graduate study and research leading to the degrees of Master of Science and Doctor of Science in the fields of Acoustics, Flight Sciences, and Structures and Dynamics. Applicants who are awarded Research Scholar Assistantships will receive stipends of up to $7,000 a year for a Master of Science degree and $8,000 a year for the Doctor of Science degree. Applications, a JIAFS brochure, and additional information may be obtained from Professor S.W. Yuan, JIAFS, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052.

THE GWU—NSRDC GRADUATE PROGRAMS

Off-campus graduate programs are offered in cooperation with the Naval Ship Research and Development Centers, Annapolis and Carderock, Md. Programs of study lead to a Master's degree in engineering administration, ocean and marine engineering, materials science, or systems science. The programs are open to all qualified applicants in the Annapolis and Carderock areas. Students

not seeking a degree may register for courses offered in these programs providing they have the approval of the faculty adviser at the time of registration. For additional information, write to the Manager of Engineering Admissions, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052.

COOPERATIVE EDUCATION PROGRAM IN ENGINEERING

Cooperative education is a process of education which formally integrates the student's academic study with work experience in cooperating employer organizations. The usual plan is for the student to alternate periods of college study with periods of experience in appropriate fields of industry and government. The experience periods are considered an integral part of the student's education. Through the interaction of the study and work experiences, the student enhances his academic knowledge, his personal development, and his professional preparation. The teaching faculty, the coordinators, and the employing supervisors share in the educational process of the cooperative student.

The following factors are adhered to as closely as possible for the student's working experience:

1. The student's employment is related as closely as possible to his field of study and individual interest within his field.
2. The employment is considered to be a regular, continuing, and essential element in the educational process.
3. The working experience will ideally increase in difficulty and responsibility as the student progresses through the academic curriculum. Normally the salary of the student will increase accordingly.

The student's working experience in industry or government gives him the opportunity to meet and work with men and women under varied conditions, to get along with them, learn from them, respect them, and earn their respect. Indeed, these advantages alone could be as important in shaping a young person's life as the opportunity to obtain experience in a chosen field.

ADVANTAGES OF COOPERATIVE EDUCATION

Combines Theory and Practice.—By coordinating the work experience in industrial and governmental organizations with the campus education program, theory and practice are closely integrated, and students find greater relevance in their studies. As a result of this alternation between academic and industrial environments, the student tends to understand the role and meaning of each environment, with a deeper appreciation for each.

Helps Finance Educational and Living Expenses.—The student's earnings will contribute substantially to financing his own education and living expenses, leading to independence and contributing significantly to his self-esteem and confidence. As stated earlier, it is expected that as the working experience increases in difficulty and responsibility as the student progresses through the academic curriculum, the salary of the student will increase accordingly.

Serves as a Bridge to the Future.—Cooperative education helps markedly to orient students to the world of work. Most students are genuinely concerned about their future life work. They want to know more about the range of occupations open to them, and the potentials and limitations of these fields. They want to know about the qualifications demanded and their own fitness. Through cooperative education programs, students have opportunities for exploring the

own abilities in connection with real jobs, and they find a direct means of gaining information and guidance not only in the occupations in which they are employed but in a number of related fields as well. They have a chance to test their own aptitudes more fully than is normally possible on campus.

Increases Motivation to Achieve.—This coordination of work and study increases student motivation. As students see connections between jobs they hold and the things they are learning in school, greater interest in academic work develops. During the work periods there is a tendency for the student to develop good work habits because his efforts as a productive and salaried employee are rated by the employer.

Enhances Human Relationships.—Because the work experiences involve the students in relations with co-workers who come from a variety of backgrounds, and because success in these jobs requires constructive relationships with colleagues, most students in cooperative education develop deeper understanding of other people and greater skills in human relations.

Augments Development of Maturity.—For many students the work experience contributes to an increased sense of responsibility for their own efforts, more dependence on their own judgments, and a corresponding development of maturity. In addition, the student's role as a team member in a real and productive working environment inculcates a seriousness of life and purpose which is often delayed for the traditional college graduate.

RESPONSIBILITIES OF THE COOPERATIVE STUDENT

As a cooperative student working in association with the professionals in his field, the student must adopt professional standards of conduct. He is also a representative of the George Washington University School of Engineering and Applied Science. After each work period the student prepares a report describing his duties and responsibilities at work, and his supervisor sends an appraisal of his work performance to the Cooperative Program Coordinator. These reports are reviewed with the student and become part of his University record.

The cooperative program is a three-way partnership among the student, his employer, and George Washington University. The student's responsibilities extend equally to each of the other two members of the partnership, and the partnership cannot be altered during the program without the knowledge and consent of all.

WHY EMPLOYERS PARTICIPATE IN COOPERATIVE EDUCATION PROGRAMS

Industry and government agencies have found that cooperative students are valuable employees. Generally speaking, they are alert and energetic young people who, stimulated by a definite goal, return more than a day's work for a day's pay. Graduates of the cooperative program represent a good source of well-trained manpower. The training period provides an opportunity for the employer to evaluate the student as a prospective permanent employee. Employers feel that this program is an important part of their effort to attract well-qualified employees. At the same time, the student is able to evaluate the employer in terms of his future plans and interests. About half of the cooperative graduates establish such mutually beneficial relationships with their employers that they remain in permanent employment after graduation, with a substantial head start in their careers.

It is emphasized, however, that neither the student nor the employer is ob-

ligated for permanent employment after graduation. Industry and government agencies consider participation in cooperative education as a long-range investment rather than a current expense. As a partner with the University, the employer is engaged in a joint effort to develop young talent more fully, thus assuring better education for the student, improved utilization of the graduate, and greater cooperation with the University.

SCHOLARSHIP REQUIREMENTS

Students entering the program must be in good academic standing and must have completed at least two semesters of academic study prior to their first work assignment. To remain in the program, the student must maintain a passing average and perform satisfactorily for his employer.

LIVING ACCOMMODATIONS

Arrangements will be made for students in the cooperative program to retain their dormitory and dining privileges at the University, if they so desire, during the work periods. During this time, they will also retain full student privileges and have access to all University facilities. Faculty will be available for consultation by appointment.

WORK-STUDY SCHEDULES

At this time, individual schedules are being arranged with the various employers in the Washington area. Since each employer operates differently, special schedules are arranged which are mutually satisfactory to the student, the employer, and the School.

Generally, the student's schedule is arranged with the employer after he has successfully completed the first year of study. Many employers will require the student to work during the summer immediately following the freshman year. The student returns to the School for the sophomore year, working again during the second summer. Beginning with the third year, students alternate between employer and classroom each semester for the next two years, returning to the classroom for the fifth and final year. Schedules for transfer students are arranged on an individual basis according to the number of credit hours transferred and the employer's requirements.

Arrangements have been made or are in progress with many businesses, industrial organizations, and governmental agencies for employment opportunities.

COOPERATIVE PROGRAM WITH NAVY LABORATORIES

Arrangements have been made with the U.S. Naval Ship Research and Development Centers, Annapolis and Carderock, Md., and with other naval laboratories in which it is possible for the student to earn more than $14,500 on planned technical work assignments, obtain a Bachelor of Science degree in such areas as civil, electrical, or mechanical engineering, and be in a preferred position upon graduation to obtain a permanent Civil Service position with a grade and salary commensurate with the student's education and experience.

Tuition, textbooks, and fees (exclusive of room and board) up to 50 per cent may be granted on request. If tuition assistance is received, the cooperative student must agree to serve as a government civilian employee after graduation for a period to be determined by regulations in effect at that time.

To participate in the program at the naval laboratories, the student must be academically acceptable to the University and must meet the requirements of the Civil Service Commission for employment at these laboratories.

Work Experience.—This program integrates formal study at this School with practical work experience, an essential element of the educational process. The employment is related to the field of study in which the student is engaged, and it is diversified to afford breadth of experience. The work experience increases in difficulty and responsibility and, in general, parallels the student's progress through the academic phases of his program.

As a Civil Service employee, the co-op student is eligible for many federal benefits, including annual leave, sick leave, paid holidays, health benefits, and life insurance.

Freshman Admission.—Applications for the cooperative education program should be submitted before March 1 of the senior high school year. Students graduating at mid-term and wishing to begin study in the spring semester should apply no later than December 1.

Transfer Students Admission.—Transfer students from other institutions should submit cooperative education applications and required credentials prior to June 1 for the fall semester, December 1 for the spring semester, and May 1 for the summer sessions. The transfer student should be in good standing as to scholarship and conduct. He should be eligible to return to the last previously attended institution in the semester for which he seeks admission to this University.

Study-Work Schedule

		*Grade**	*Annual Pay Scale*
Preregistration Summer	Work Period	GS-2	$5,996
Freshman Year Summer	George Washington University		
	Work Period	GS-3	6,764
Sophomore Year Summer	George Washington University		
	Work Period	GS-4	7,596
Junior Year Fall	George Washington University		
Junior Year Extended, Spring, Summer, Fall	Work Period	GS-4	7,596
Junior Year Spring	George Washington University		
Summer	Work Period	GS-5	8,500
Senior Year	George Washington University		

For additional information, write to Manager, Cooperative Education, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052.

UNDERGRADUATE DUAL-DEGREE PROGRAM WITH HAMPTON INSTITUTE

The School of Engineering and Applied Science and Hampton Institute, both accredited four-year degree-granting institutions, have established a 3–2 dual-degree program that joins general education and career education in a unique and comprehensive experience. This program is in addition to the engineering programs already offered on the campus at George Washington University.

Hampton offers several four-year degree programs in a variety of disciplines.

* Industrial employers offer comparable salary rates.

To provide opportunity for careers in engineering, Hampton Institute joined with the School of Engineering and Applied Science, which offers accredited four-year programs in engineering.

Students enrolled in the 3–2 program at Hampton first follow a general program of study for three years at Hampton Institute. This program is based on the social sciences, humanities, and the preparatory background engineering courses in mathematics, physics, and chemistry, which help develop broad cultural perspectives, analytic abilities, and communication skills.

After successful completion of the first phase of study, students then follow a two-year career program in engineering at the School of Engineering and Applied Science. During this phase of the study, students may specialize in any of the following areas of engineering, which are also offered in GWU's regular four-year programs:

1. Civil Engineering, or the following options: Environmental Engineering, Computer-oriented Civil Engineering.

2. Electrical Engineering, or the following option: Computer Science.

3. Mechanical Engineering, or the following options: Energy and Power Resources, Computer-oriented Mechanical Engineering.

Some of the advantages of the dual degree program follow.

The student receives two degrees: a B.S. from Hampton Institute and a B.S. in an engineering area from George Washington University. This unique academic background provides the student with many options in choosing a profession upon graduation. The student may go into engineering practice, continue study for advanced degrees, or enter other professional areas such as law, medicine, or teaching.

Minority students may begin their education at Hampton Institute, a predominantly black college, and then complete the last two years of their education at an urban university in Washington, D.C., thereby widening their educational, social, and cultural backgrounds.

Dual-degree students, while at Hampton, may participate in the Summer Training Program. In this program, students may work for a 12-week period during the summer at the Joint Institute for Acoustics and Flight Sciences at the National Aeronautics and Space Administration's (NASA) Langley Research Center in Hampton, Va., obtaining valuable work experience in a first-rate laboratory while earning funds for the following academic year. This program may be made available to some prefreshmen who desire to work upon graduation from secondary school.

In GWU's Cooperative Education Program in Engineering (see page 36) a student may work summers and one or two academic semesters and earn sufficient funds to help pay expenses while obtaining valuable engineering experience.

The 3–2 program offers the student time to acclimate himself to college life and study at a reasonable cost while preparing for an exciting and rewarding profession.

For further information write or call Dean of Admissions and Registrar, Hampton Institute, Hampton, Va. 32668, Phone (804) 727-5328 or 727-5329, or Manager, Engineering Admissions, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052, Phone (202) 676-6168.

CONTINUING ENGINEERING EDUCATION PROGRAM

> The future of the engineering profession will depend to a considerable extent on the demonstrated competence of individual engineers to make optimum use of the latest scientific and technical knowledge in dealing with current and future problems. Participation in programs of continuing engineering studies will ensure that such competence can be maintained.*

The School of Engineering and Applied Science is meeting the need expressed above with a comprehensive program of noncredit courses. The objective of the program is to enhance the competence of practicing engineers rather than to aid in their attainment of academic degrees. Tuition for noncredit courses offered in the program is usually paid by the employers, who recognize the necessity for immediate improvement in the employee's on-the-job capability. Staff reorganizations and reductions have required many engineers to change their specialties or to take on additional duties within their present jobs; continuing engineering education can provide the education and skills necessary for these changes. Continuing engineering education also aids in qualifying for promotions, and for maintaining certification in certain professional fields.

The program will present about 200 noncredit courses this year. A number of them last for five days (30 classroom hours), while others last for two, three, or four days. Some courses are presented in the evening (two-hour sessions once a week for 10 to 12 weeks). In some courses, presentation of theory is augmented by workshops to give participants practice in the application of the particular discipline. Students from all over the nation and from many foreign countries have participated in courses. Their variety of experience and background enhances the value of the discussions, enriching their relationships with each other and with their instructors.

Some of the subjects which have been presented in this program include:

Antennas
Clinical Engineering
Configuration Management
Construction Estimating
Construction Management
Cost Analysis for Engineers
Design to Cost
Digital and Data Communications
Digital Integrated Circuits
Electrical Controls and Protective Relaying
Energy Choices
Energy Conservation
Environmental Impact Statements
Fault Tree Analysis
Fiber and Integrated Optics
Forecasting Techniques
Heat Pipes
Infrared Technology
Laser Communications
Lasers
Life Cycle Costing
Management of Research and Development
Metric Conversion
Minicomputers
Monte Carlo Simulation
Nonparametric Statistics
Operations Research
Radar Systems
Reliability
Satellite Communication Systems
Solar House Heating and Cooling
Standards and Calibration Labs
Statistics for Engineers
Surface Effect Vehicles
System Safety
Telecommunications

* American Society for Engineering Education, Final Report: Goals of Engineering Education (Washington, D.C.: January, 1968).

New courses are added as needs become apparent in various fields and repeated courses are continuously revised.

In addition to the faculty of the School of Engineering and Applied Science, outstanding lecturers and instructors from other universities, from industry, and from government laboratories and agencies serve on the instructional staff of the program.

The program also offers noncredit contact courses off-campus specifically tailored for the needs and background of the engineers employed by a company or agency. Tuition for these courses is usually slightly lower than for those offered at the University. Such courses have been presented as far away as Argentina.

To receive announcements or additional information on the program, write to Continuing Engineering Education Program, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052, or call (202) 676-6106.

Administration

Harold Liebowitz, D.Ae.E., *Dean of the School of Engineering and Applied Science; Co-director of the Joint Institute for Acoustics and Flight Sciences*

James Elmer Feir, Ph.D., *Assistant Dean of the School of Engineering and Applied Science*

Sam Rothman, Ph.D., *Chairman of the Department of Engineering Administration*

William Henry Marlow, Ph.D., *Chairman of the Department of Operations Research; Director of the Institute for Management Science and Engineering*

Arnold Charles Meltzer, D.Sc., *Chairman of the Department of Electrical Engineering and Computer Science*

Shao Wen Yuan, Ph.D., *Chairman of the Department of Civil, Mechanical, and Environmental Engineering; Associate Director, Joint Institute for Acoustics and Flight Sciences*

Alfred Martin Freudenthal, D.Sc., *Director of the Institute for the Study of Fatigue, Fracture, and Structural Reliability*

John Edward Duberg, Ph.D., *Director of the NASA-Langley Graduate Program; Director of the Joint Institute for Acoustics and Flight Sciences*

Malcolm P. Clark, M.S., *Administrator of the NASA-Langley Graduate Program*

William F. Shanahan, B.S., *Manager of Engineering Admissions and Cooperative Education*

John Lindsey Whitesides, Jr., Ph.D., *Assistant Director, Research and Education, Joint Institute for Acoustics and Flight Sciences*

John Witherspoon, M.S., *Assistant Administrator of the NASA-Langley Graduate Program*

Jack Emerson Mansfield, B.S. in E.E., *Director of the Continuing Engineering Education Program*

Frederic A. Hooper, M.S., *Research and Resources Officer*

George Ellowitz, B.A., *Executive Associate to the Dean*

DEAN'S COUNCIL

Harold Liebowitz *(Chairman)*, R.R. Fox, A.C. Meltzer, J.B. Smith

ACADEMIC CONSULTANT

Ernst Weber, Ph.D., *Chairman, Division of Engineering, National Research Council*

Advisory Council*

THE PURPOSES of the Advisory Council for the School of Engineering and Applied Science are to strengthen communication between the School and the other colleges, schools, and divisions of the University as well as between the School and the University's Board of Trustees; to advise on the programs of instruction, research, and service in the School and to help interpret these programs to the community and the nation; and to stimulate support for the continued development of the School and its programs.

MEMBERS OF THE COUNCIL FOR 1975–76

Chairman: Stephen R. Woodzell *(University Trustee), Former President of the Potomac Electric Power Company*
Raymond L. Bisplinghoff, *Chancellor, University of Missouri, Rolla*
Bruno A. Boley, *Dean, Technological Institute, Northwestern University*
George M. Bunker, *President, Martin Marietta Corporation*
J.P. Chambers, *President, Melpar Division E-Systems, Inc.*
Joseph Fox, *Vice President, Civil-Space Systems, Federal Systems Division, International Business Machines*
Moses Freedman, *Vice President, Blake Construction Company*
Alfred M. Freudenthal, *Professor of Civil and Materials Engineering*
Eugene G. Fubini, *Engineering Consultant*
Martin Goland, *President, Southwest Research Institute*
William J. Harris, Jr., *Vice President, Research and Test Department, Association of American Railroads*
Alexander Hassan, *Washington, D.C.*
Walter R. Hibbard, Jr., *Vice President, Research and Development, Owens Corning Fiberglas Corporation*
William Holt, *Carborundum Company, Niagara Falls, N.Y.*
William H. Marlow, *Chairman, Department of Operations Research*
Bernard A. Schriever, General USAF (Ret.), *Chairman of the Board, Schriever & McKee Associates, Inc.*
Arthur W. Sloan, *Chief Executive Officer, Susquehanna Corporation*
G.R. Tatum, *Vice President, Vitro Corporation*
Edward G. Uhl, *President, Fairchild-Hiller Corporation*
Ernst Weber, *Chairman, Division of Engineering, National Research Council*
Harold A. Wheeler, *Chief Scientist, Wheeler Laboratories, Inc.*
James F. Young, *Vice President—Engineering, General Electric Company*
L.A. Zadeh, *Chairman, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley*

*The President of the University, the Vice President for Academic Affairs, and the Dean of the School of Engineering and Applied Science are ex officio members of the Advisory Council.

PROGRAMS OF STUDY AND COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES are listed programs of study, curricula, and courses of instruction offered by the School of Engineering and Applied Science.

Students who are not candidates for degrees but who wish to take courses offered by the School should apply for admission to the Division of University Students.

EXPLANATION OF COURSE NUMBERS

Courses numbered from 1 through 199 are planned for undergraduate credit, although certain courses may be taken for graduate credit when arrangements are approved in advance by the instructor and the Dean. Courses numbered 201 to 300 are planned for graduate credit and may in certain instances be taken by qualified undergraduate students. Courses numbered from 301 to 400 are primarily for doctoral students.

SEMESTER HOURS OF CREDIT

The number of semester hours credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, a year course giving three hours of credit each semester is marked (3–3), and a semester course giving three hours credit is marked (3). A semester hour consists of the completion of one 50-minute period of class work or of one laboratory period a week for one semester.

TIME OF COURSE OFFERINGS

Following course descriptions is a parenthetical statement listing the semester for which the course is scheduled to be offered. The term "academic year" is used only with two-semester courses, and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester; the term "as arranged" is used for courses which could not be scheduled at the time of printing this catalogue. Offerings for the summer sessions are not designated in this catalogue. Students should consult the *Summer Sessions Catalogue* or *Schedule of Classes* for summer offerings. A *Schedule of Classes* is also published for each fall and spring semester which provides up-to-date information concerning the time of course offerings.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designations.

Acct	Accounting	**Engl**	English
ApSc	Applied Science	**Geol**	Geology
Bioc	Biochemistry	**Math**	Mathematics
BiSc	Biological Sciences	**ME**	Mechanical Engineering
Chem	Chemistry	**Micr**	Microbiology
CE	Civil Engineering	**OR**	Operations Research
CSci	Computer Science	**Phys**	Physics
Econ	Economics	**Soc**	Sociology
EE	Electrical Engineering	**Stat**	Statistics
EAd	Engineering Administration	**U&RP**	Urban and Regional Planning
EngS	Engineering Science		

Applied Science

Interdepartmental offerings.

UNDERGRADUATE COURSES

57 Analytical Mechanics I (2)

First half of a one-year sequence. Concepts of statics, including force systems, equilibrium conditions, simple structures, distributed forces, shear and moments, friction and the concept of work, virtual work and stability. Prerequisite or concurrent registration: ApSc 113, Phys 2. (Fall)

58 Analytical Mechanics II (3)

Second half of a one-year sequence. Concepts of dynamics, including kinematics of particles, velocity and acceleration, Newton's laws of motion, momentum, work, kinetic energy, potential energy, central force fields, vibrations, resonance, dynamics of systems of particles, kinematics of a rigid body, dynamics of a rigid body. Introduction to Lagrangian-Hamiltonian formulation. Prerequisite: ApSc 57. (Spring)

113 Engineering Analysis I (3)

Analytical methods appropriate to the solution of engineering problems, including application of matrices and linear algebra, ordinary differential equations, vector calculus and integral theorems, complex algebra. Prerequisite: Math 32. (Fall and spring)

114 Engineering Analysis II (3)

Analytical methods appropriate to the solution of engineering problems, including application of Bessel functions, Legendre polynomials, Fourier series and integrals, Laplace transforms, partial differential equations in engineering and applied science. Prerequisite: ApSc 113. (Fall and spring)

115 Engineering Analysis III (3)

Solution of engineering problems using concepts from probability and statistics, including random variables, distribution functions, mathematical expectation, point and confidence interval estimation, hypothesis testing,

correlation, and regression. This methodology applied to problems of structural design, bioengineering, manufacturing processes, product quality, equipment reliability, engineering management, and societal engineering. Prerequisite: Math 32. (Fall and spring)

GRADUATE COURSES

211 Analytical Methods in Engineering I (3)

Engineering applications of the theory of complex variables including contour integration, conformal mapping, inversion integral, and boundary-value problems. Prerequisite: approval of Department. (Fall and spring)

212 Analytical Methods in Engineering II (3)

Analytical methods appropriate to the formulation of engineering problems including finite dimensional vector spaces, eigenvalue problems, generalized Fourier series, tensor calculus, curvilinear coordinates. Prerequisite: approval of Department. (Fall)

213 Analytical Methods in Engineering III (3)

Analytical techniques for solution of boundary-initial problems in engineering involving wave propagation, diffusion processes, and potential distributions. Prerequisite: approval of Department. (Fall and spring)

214 Analytical Methods in Engineering IV (3)

Introduction to variational methods in engineering including Ritz and Galerkin approximation methods for boundary-value problems. Aspects of linear integral equations arising from engineering analysis. Prerequisite: approval of Department. (Spring)

215 Analytical Methods in Engineering V (3)

Advanced methods of solution of boundary-initial value problems in engineering, including characteristics, wave propagation, and Green's functions. Prerequisite: ApSc 213. (Fall 1975 and alternate falls)

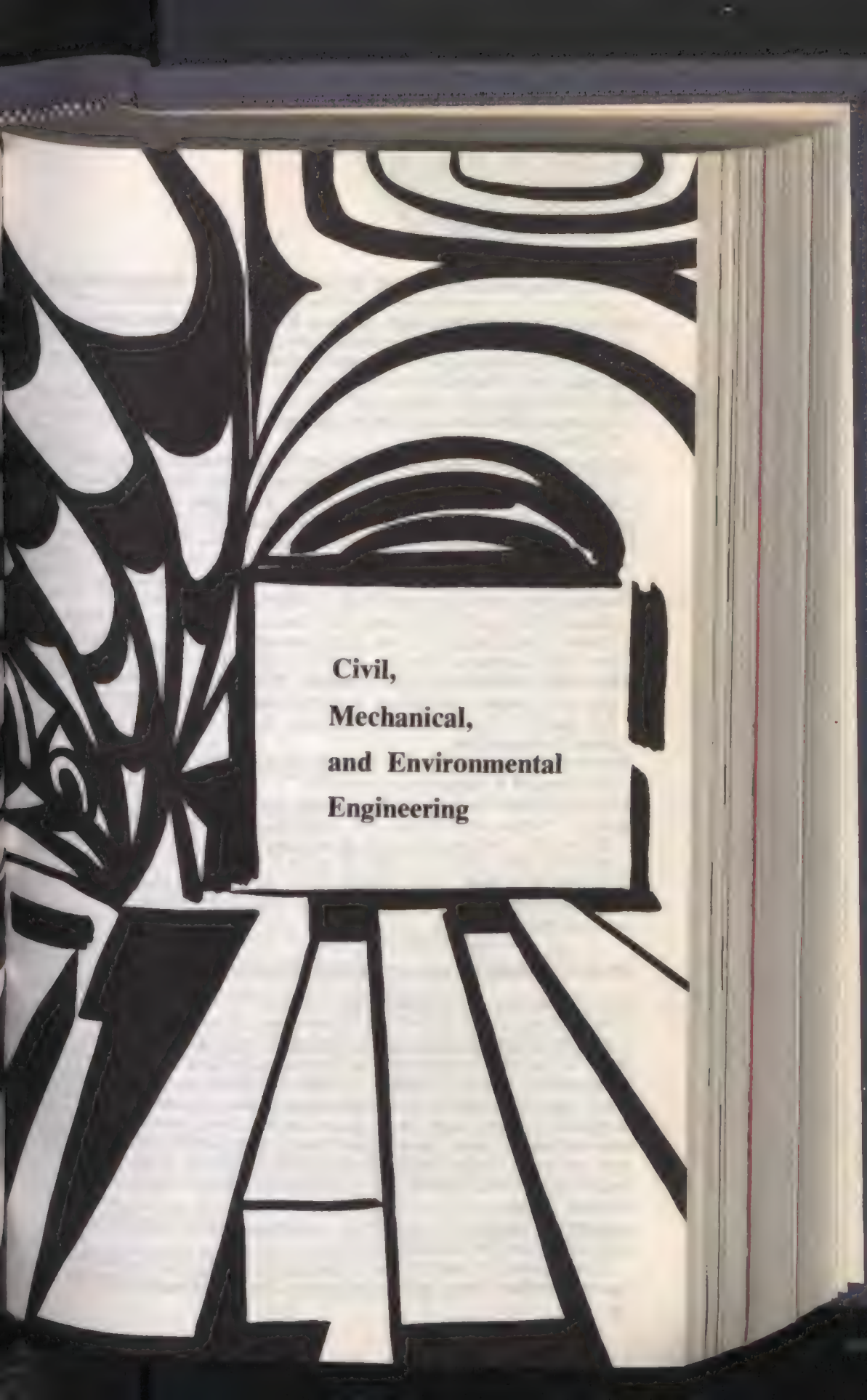
216 Special Topics in Engineering Analysis (3)

Selected topics such as (1) perturbation techniques applied to approximate solution of nonlinear boundary and initial value problems in engineering, (2) application of singular integral equations in problems of mechanics, (3) applications of elements of functional analysis in engineering and science. Prerequisite: approval of Department. (Spring 1976 and alternate springs)






HOU HOS


Civil,
Mechanical,
and Environmental
Engineering

Civil, Mechanical, and Environmental Engineering

Professors C.H. Walther, G.M. Arkilic, R.R. Fox, Harold Liebowitz, A.M. Freudenthal, S.W. Yuan *(Chairman)*, Joseph Foa, J.E. Feir, T.G. Toridis, H.V. Nutt *(Research)*, J.P. Campbell *(Research)*, John Eftis, A.K. Noor *(Research)*, Fred Schulman *(Research)*

Adjunct Professors J.E. Duberg, I.E. Garrick, B.L. Clarkson, A.A. Wolf, E.C. Kollmann, R.M. Sorensen, Yoram Gordon, Harry Perry, H.H. Schmitt, L.W. Tombaugh

Professorial Lecturers R.E. Fulton, Robert Wilson, Joseph Kirshner, M.P. Gaus, W.P. Reid, Robert Dillon, R.A. Hechtman, Charles Molloy, Walter Olstad, M.J. Queijo, R.P. Nalesnik, Otto Mayr, J.B. Scalzi, Philip Donely, M.K Ochi, L.S. Galowin, R.F. Baker, F.L. Young, I.K. Loftin, Jr., M.S. Ojalvo

Associate Professors B.I. Hyman, A.M. Kiper, J.S.W. Chi, M.K. Myers *(Research)*, D.L. Jones *(Research)*, J.L. Whitesides, Jr. *(Research)*, C.M. Gilmore, A.R. Schrader *(Research)*, J.C. Yu *(Research)*, H.L. Runyan, Jr. *(Research*

Associate Professorial Lecturers W.D. Erickson, R.W. Fralich, E.C. Yates, Jr., Michael Yachnis, Nils Salvesen, J.D. Shaughnessy, Jaroslaw Sobieszczanski, Manuel Stein, Gajanan Sabnis, R.B. Samworth, Benjamin Whang, M.B. Barker, G.E. Lamphere, Nicholas Basdekas, Donald Ellison, J.B. Fisher, R.W Barnwell, J.D. Buckley, Arthur Sosslau, R.J. Fisher, A.L. Burgett, Thomas McGean, Duncan MacKinnon, Kenneth Saczalski, W.J. Gunn, T.M. Walsh, P.B. Buck, E.F. Skelton, G.C. Canavos, H.A. Leybold, M.D. Gunzberger, Metin Lokmanhekim

Assistant Professors Yishu Chiu, Khalilollah Khozeimeh *(Research)*, R.S. Brice *(Research)*, B.R. Barkstrom *(Research)*

Adjunct Assistant Professors B.W. Hannah, A.K. Trehan

Assistant Professorial Lecturers J.A. Gorman, I.E. Beckwith, R.L. Bowles, J.C Hardin, C.J. Jachimowski, J.B. Robertson, G.L. Smith, R.M. Brown, R.D Matulka, R.Y. Ting, J.A. Belding, Jr., J.E. Carter, C.E. Kirby, R.C. Montgomery, K.S. Park, T.A. Straeter, W.E. Zorumski, Anthony Boiarski, Joe Ettinger, E.B. Glynn, A.H. Purcell, J.R. Schiess, J.N. Shoosmith

Lecturer Meir Romansky

CIVIL ENGINEERING—UNDERGRADUATE STUDY

Civil engineering encompasses those branches of engineering activities most closely related to the control and improvement of our environment and of the conditions of life. Study in this field prepares students for careers in the planning, design, and construction of buildings; bridges; roads; airports; rapid transportation systems; harbors; off-shore facilities; coastal protection structures; flood and pollution control systems for rivers, estuaries, and lakes; inland navigation systems; large power generation and flood control dams; water resources projects; urban renewal and development projects; and pollution control and waste disposal projects. It also provides the scientific and technological background required for careers in municipal engineering, urban and regional planning, and environmental civil engineering, as well as for careers in engineering research in structural mechanics, ocean engineering, materials engineering, and industrialized housing.

The concern for environmental quality has led to the identification of numerous problem areas such as air, water, land, and noise pollution, among

others, which, in turn, has emphasized the need for "broad-gauged" engineering personnel who have been educated in a field of engineering and have a realistic understanding of the social, economic, and legal aspects of their professions. The senior year allows students interested in contemporary urban problems to emphasize environmental aspects by branching off into an area of environmental civil engineering, or students interested in the use of computers to select an option which will prepare them for immediate careers in computing as well as graduate study in computer-dominated or computer-oriented professional fields.

The concentration of study outlined in the curriculum below provides the essentials for beginning a career upon graduation, for registration as a professional civil engineer as required by law, and for continuing study at the graduate level. Normally the first four semesters are common to all undergraduate fields in the School; however, a student in civil engineering should select his humanities and social science electives with a view to supplementing his interest in engineering. Sociology 126, *Urban Sociology*, must be included as one of his electives.

CORE CURRICULUM

Normally the first four semesters are common to all undergraduate fields in the School of Engineering and Applied Science.

First Semester

EE 51:	Applications of Computers (3)
Math 30:	Precalculus (3)
Math 31:	Calculus of One Variable (3)
Phys 3:	Foundations of Physics (3)
Elective:	Selected from humanities or social sciences (3)

Second Semester

EngS 4:	Descriptive Geometry and Drafting (3)
Engl 9 or 10:	English Composition: Language as Communication (3)
Math 32:	Calculus of Several Variables (3)
Phys 14:	Introductory Mechanics and Thermal Physics (3)
Elective:	Selected from humanities or social sciences (3)

Third Semester

ApSc 57:	Analytical Mechanics I (2)
ApSc 113:	Engineering Analysis I (3)
ApSc 115:	Engineering Analysis III (3)
Chem 13:	General Chemistry (4)
Phys 15:	Elements of Electricity and Magnetism (3)
Elective:	Selected from Humanities or Social Sciences (3) (May be taken during the Summer Sessions)

Fourth Semester

ApSc 58:	Analytical Mechanics II (3)
ApSc 114:	Engineering Analysis II (3)
CE 110:	Introduction to Environmental Engineering (3)

CE 140:	Materials Science (3)
Phys 16:	Introduction to Modern Physics (3)
Elective:	Selected from humanities or social sciences (3) (May be taken during the Summer Sessions)

CIVIL ENGINEERING CURRICULUM

Fifth Semester

CE 120:	Introduction to the Mechanics of Solids (3)
CE 123:	Structural Theory (6)
CE 166:	Materials Engineering (2)
CE 167:	Mechanics of Materials Laboratory (1)
ME 131:	Thermodynamics (3)

Sixth Semester

CE 183:	Urban Planning (3)
CE 190:	Legal and Economic Aspects of Engineering (2)
Geol 136:	Engineering Geology (3)
ME 126:	Fluid Mechanics (3)
Elective:	Selected from humanities or social sciences (6)

Seventh Semester

CE 168:	Introductory Soil Mechanics (3)
CE 191:	Metal Structures (3)
CE 193:	Hydraulics (3)
CE 194:	Environmental Engineering I: Water Supply and Resources (3)
CE 195:	Hydrology (3)
Elective:	Technical elective (3)

Eighth Semester

CE 182:	Foundation Engineering (2)
CE 185:	Soil Mechanics and Foundation Engineering Laboratory (1)
CE 192:	Reinforced Concrete Structures (3)
CE 196:	Design and Cost Analysis of Civil Engineering Structures (3)
CE 197:	Environmental Engineering II: Waste and Pollution Control (3)
Elective:	Technical elective (2)

Technical Electives

CE 201:	Design of Metal Structures (3)
CE 202:	Design of Reinforced Concrete Structures (3)
CE 204:	Applied Soil Mechanics I (3)
CE 205:	Applied Soil Mechanics II (3)
CE 206:	Foundation Engineering (3)
CE 210:	Methods of Structural Analysis (3)
CE 215:	Urban Construction Technology (3)
CE 216:	Advanced Hydrology (3)
CE 217:	Water Resources Engineering I (3)
CE 220:	Urban Transportation Engineering (3)
CE 243:	Environmental Impact Assessment (3)
CE 253:	Failure and Reliability Analysis of Engineering Structures (3)
CE 256:	Introduction to Ocean and Coastal Engineering (3)
EAd 150:	Introduction to Engineering Administration (3)
EngS 234:	Composite Materials (3)

COMPUTER-ORIENTED CIVIL ENGINEERING OPTION

The rapidly expanding use of computers in the design and control of engineering systems provides increasing opportunities for engineering careers in which, upon graduation, a high degree of proficiency and ease in the extensive and sophisticated use of digital and other computers is essential. This program therefore replaces the technical electives of the principal professional undergraduate program with electives that provide comprehensive exposure to computer applications to the solution of problems of civil engineering. It prepares the student for immediate careers as well as for graduate study in computer-dominated or computer-oriented professional fields.

CURRICULUM

Prerequisite: first four semesters as described in the Core Curriculum, see pages 51–52.

Fifth Semester

CE 120: Introduction to the Mechanics of Solids (3)
CE 123: Structural Theory (6)
CE 166: Materials Engineering (2)
CE 167: Mechanics of Materials Laboratory (1)
ME 131: Thermodynamics (3)

Sixth Semester

CE 183: Urban Planning (3)
CE 190: Legal and Economic Aspects of Engineering (2)
Geol 136: Engineering Geology (3)
ME 126: Fluid Mechanics (3)
Elective: Selected from humanities or social sciences (6)

Seventh Semester

CE 168: Introductory Soil Mechanics (3)
CE 191: Metal Structures (3)
CE 193: Hydraulics (3)
CE 194: Environmental Engineering I: Water Supply and Resources (3)
Elective: Technical electives (6)

Eighth Semester

CE 182: Foundation Engineering (2)
CE 185: Soil Mechanics and Foundation Engineering Laboratory (1)
CE 192: Reinforced Concrete Structures (3)
CE 196: Design and Cost Analysis of Civil Engineering Structures (3)
Elective: Technical elective (5)

Technical Electives

CE 197: Environmental Engineering II: Waste and Pollution Control (3)
CE 210: Methods of Structural Analysis (3)
CSci 278: Analog and Hybrid Computers (3)

EE 152:	Introduction to Digital Computers (3)
EngS 282:	Computer-aided Design (3)
EngS 283:	Application of Computer Graphics in Engineering (3)
EngS 284:	Numerical Methods in Engineering (3)
*Geol 189:	Geophysics of the Solid Earth (2)

ENVIRONMENTAL CIVIL ENGINEERING OPTION

Environmental civil engineering is concerned with the study of the problems of environmental quality—air, water, land, noise, transportation, urban renewal, etc.—that affect the life, development, and behavior of the individual as well as society. One of the goals of this program is to provide the student with the essentials for beginning a career upon graduation so that he may be in a position to contribute to the solutions of the problems related to the improvement of environmental quality. The curriculum prepares the student for graduate study or for a career in environmental civil engineering.

CURRICULUM

Prerequisite: first four semesters as described in the Core Curriculum, see pages 51–52.

Fifth Semester

CE 120:	Introduction to the Mechanics of Solids (3)
CE 123:	Structural Theory (6)
CE 166:	Materials Engineering (2)
CE 167:	Mechanics of Materials Laboratory (1)
ME 131:	Thermodynamics (3)

Sixth Semester

CE 183:	Urban Planning (3)
CE 190:	Legal and Economic Aspects of Engineering (2)
*Geol 136:	Engineering Geology (3)
ME 126:	Fluid Mechanics (3)
Elective:	Selected from humanities or social sciences (6)

Seventh Semester

CE 168:	Introductory Soil Mechanics (3)
CE 191:	Metal Structures (3)
CE 193:	Hydraulics (3)
CE 194:	Environmental Engineering I: Water Supply and Resources (3)
CE 195:	Hydrology (3)
Elective:	Technical elective (3)

Eighth Semester

CE 182:	Foundation Engineering (2)
CE 185:	Soil Mechanics and Foundation Engineering Laboratory (1)
CE 192:	Reinforced Concrete Structures (3)

* For Geology course descriptions, see the *Undergraduate and Graduate Catalogue*.

CE 196: Design and Cost Analysis of Civil Engineering Structures (3)
CE 197: Environmental Engineering II: Waste and Pollution Control (3)
Elective: Technical elective (2)

*Technical Electives**

Bioc 221: General Biochemistry (3 or 4—4 or 5)
BiSc 11–12: Introductory Biology for Science Majors (4–4)
Chem 50: Introduction to Organic Chemistry (4)
CE 240: Environmental Microbiology (3)
CE 241: Environmental Chemistry (3)
CE 242: Solid Waste Disposal (3)
CE 243: Environmental Impact Assessment (3)
EngS 242: Materials Recycling and Recovery (3)
ME 176: Environmental Engineering Problems (3)
Micr 211: Microbiology (4)

GEOTECHNICAL CIVIL ENGINEERING OPTION

Geotechnical civil engineering encompasses a broad range of engineering problems involving soil mechanics, foundation engineering, rock mechanics and geological aspects of engineering. More specifically, planning, design, and construction of structures founded on or constructed of soil and rock constitute the main features of this branch of civil engineering. Included are the design and construction of foundations for all types of buildings, bridges, highway and airfield pavements; design and construction of earth and rock-fill dams, embankments, waterfront structures, tunnels, drainage facilities, and stabilization procedures for reclamation of marginal lands. Engineering geology, which is the application of geological data, principles, and interpretations to naturally occurring earth and rock masses, constitutes an important part in the planning and design stages of civil engineering structures of the above type.

CURRICULUM

Prerequisite: first four semesters as described in the Core Curriculum, see pages 51–52, with the following changes:

Third Semester: Geology 21 *Physical Geology* (3), will be taken instead of the Elective.

Fourth Semester: Geology 122 *Structural Geology* (4), will be taken instead of (a) CE 110 *Introduction to Environmental Engineering* and (b) elective.

Fifth Semester

CE 120: Introduction to the Mechanics of Solids (3)
CE 123: Structural Theory (6)
ME 131: Thermodynamics (3)
*Geol 163: Sedimentation (4)

* For Biological Sciences, Chemistry, and Geology course descriptions, see the *Undergraduate and Graduate Catalogue.*

Sixth Semester

ME 126:	Fluid Mechanics (3)
CE 190:	Legal and Economic Aspects of Engineering (2)
*Geol 128:	Geomorphology (3)
*Geol 136:	Engineering Geology (3)
Elective:	Selected from humanities or social sciences (6)

Seventh Semester

CE 168:	Introductory Soil Mechanics (3)
CE 191:	Metal Structures (3)
CE 193:	Hydraulics (3)
CE 194:	Environmental Engineering I: Water Supply Resources (3)
CE 195:	Hydrology (3)
*Geol 189:	Geophysics of the Solid Earth (2)

Eighth Semester

CE 182:	Foundation Engineering (2)
CE 185:	Soil Mechanics and Foundation Engineering Laboratory (1)
CE 192:	Reinforced Concrete Structures (3)
*Geol 195:	Field Work (2)
Elective:	Selected from humanities or social sciences (6)
Elective:	Technical elective (2)

CIVIL ENGINEERING UNDERGRADUATE COURSES

110 Introduction to Environmental Engineering (3)

Chemistry of natural water as it affects hardness, alkalinity, corrosion, and carbonate balance. Water treatment chemistry, softening, coagulation, and flocculation. Chemistry of rivers, oxygen balance, nitrogen cycle, carbon cycle, eutrophication. Waste water treatment. Removal of dissolved organic material, nitrogen, phosphorous, and chlorination. Classification of organic and inorganic air pollutants. Chemical reaction and formation of secondary air pollutants. Chemical analysis of inorganic pollutants; fluorides, oxides of nitrogen, sulfates, chlorides, sulfur compounds, oxides of carbon, and oxidants. Chemical analysis of organic pollutants; aliphatic hydrocarbons. Control of pollutant emission by absorption, adsorption, and combustion. Prerequisite: Chem 13. (Spring)

120 Introduction to the Mechanics of Solids (3)

Three-dimensional strain and stress. Constitutive equations for elastic, viscoelastic, and plastic materials. Axial load, bending and torsion of struts and beams. Instability and failure. Prerequisite: ApSc 58. (Fall)

123 Structural Theory (6)

Theory of determinate and indeterminate structures using both classical and modern approaches. Prerequisite or concurrent registration: CE 120. (Fall)

140 Materials Science (3)

Electron structure of atoms; atomic and molecular bonding; energy bands; crystal structure; imperfections; noncrystalline solids; reaction rates; diffusion; transport phenomena—thermal conductivity, electrical conduction;

* For Geology course descriptions, see the *Graduate and Undergraduate Catalogue*.

semiconductors; magnetism; elasticity and anelastic phenomena; microplasticity; plastic deformation; fracture. Prerequisite or concurrent registration: ApSc 114, Phys 16. (Spring)

166 **Materials Engineering** (2)

Mechanical properties and their description; effect of microstructure on the mechanical behavior of metals, ceramics, polymers, and polyphase materials; effect of strain-rate and temperature; creep, fatigue, and fracture; effect of surface and environment; materials evaluation for structural performance. Prerequisite: CE 120, 140; or approval of Department. (Fall)

167 **Mechanics of Materials Laboratory** (1)

Measurement of strains and study of failure resulting from applied forces; ductile, brittle, anisotropic, elastomeric and plastic materials; tension, compression, bending, creep, and fatigue loading. Prerequisite or concurrent registration: CE 166. (Fall)

168 **Introductory Soil Mechanics** (3)

Engineering properties of soils; analysis of lateral earth pressures, bearing capacity, foundations, and slope stability. Prerequisite: CE 120, ME 126. (Fall)

182 **Foundation Engineering** (2)

Subsurface exploration, design of shallow foundations, design of pile foundations, earth-retaining structures. Prerequisite: CE 168. (Spring)

183 **Urban Planning** (3)

Engineering aspects of urban planning, including transportation, water supply and sewerage, public utilities, safety and convenience, and natural environment. (Spring)

185 **Soil Mechanics and Foundation Engineering Laboratory** (1)

Laboratory experiments for the classification, strength, compressibility, and general engineering properties of soils. Prerequisite: CE 168. (Spring)

190 **Legal and Economic Aspects of Engineering** (2)

Laws relating to engineering practice, preparation of contract documents and specifications, consideration of economic factors in engineering design decisions. (Spring)

191 **Metal Structures** (3)

Principles of the design of metal structures; structural elements; connections; specific problems of analysis; methods of construction. Prerequisite: CE 123. (Fall)

192 **Reinforced Concrete Structures** (3)

Principles of the design of reinforced concrete structures. Details of reinforcement of structural elements. Monolithic structures, precast elements, methods of construction. Prerequisite: CE 123. (Spring)

193 **Hydraulics** (3)

Fluid statics: applications to calculation of boundary forces in a static fluid, buoyancy, and flotation. Application of kinematic principles; flow fields, stream tubes, and flow nets. Fluid dynamics: applications to pipe

flow, hydraulic models, measurement of pressure, and velocity. Ope channel flow: applications to water resources engineering. Prerequisite ME 126. (Fall)

194 **Environmental Engineering I: Water Supply and Resources** (3)

Planning and design of water supply and waste-water disposal system Water quality control and treatment processes. Desalination, stream pollution control. Prerequisite or concurrent registration: CE 193. (Spring)

195 **Hydrology** (3)

Descriptive hydrology: hydrologic cycle, precipitation, stream flow, evap oration, and transpiration. Quantitative hydrology: hydrograph analysis estimating volume of runoff, runoff from snow, hydrographs of basin ou flow, storage routing. Probability concepts in hydrology: flood frequency rainfall frequency, drought, stochastic hydrology. Prerequisite: ApSc 14 ME 126, and CE 193, which may be taken concurrently. (Fall)

196 **Design and Cost Analysis of Civil Engineering Structures** (3)

Design of civil engineering structures such as wharves, piers, bulkheads tunnels, dams, bridges, water treatment, and drainage systems. Prerequ site: senior status. (Spring)

197 **Environmental Engineering II: Waste and Pollution Control** (3)

Disposal of sewage, biological treatment, chemical treatment, filtration activated sludge, sludge handling and disposal. Control of industrial wastes and of nuclear waste products. Solid waste disposal. Prerequisite CE 193. (Fall)

198 **Research** (1 to 3)

Applied research and experimentation projects, as arranged. Prerequisite junior or senior status. (Fall and spring)

MECHANICAL ENGINEERING—UNDERGRADUATE STUDY

Mechanical engineering is primarily concerned with physical systems in mo tion. A mechanical engineer is concerned with the conversion, transfer, an control of energy from its source to its moving system. He has contributed s our present technology in every industry and in every phase of research, de sign, development, and production. Land and marine vehicles, transportation systems, air-conditioning systems, nuclear reactors and fuel cells, low-pollu tion control devices, and a host of other devices lie in his domain. His train ing should provide him with the ability to formulate problems based on funda mental laws of nature, to recognize the types of methods which are applicable to their solution, to read with understanding the relevant work, and to come up with a usable answer. The mechanical engineering curriculum provides background for careers in research, design, development, and manufacture in a wide variety of industries.

Course offerings in the field of mechanical engineering, which begin with broad foundation in physics, chemistry, mathematics, humanities, and social sciences, consist of studies in basic mechanics of solids and fluids, electrical and electronics, material sciences, dynamic analysis, thermal sciences, energy conversion and power, environmental control, and the design of machines and

systems and their control. Furthermore, technical electives in the senior year allow students interested in the use of computers to select an option which will prepare them for immediate careers in computing as well as graduate study in computer-dominated or computer-oriented professional fields. The program of study outlined below is based on the concept that the mechanical engineer must be prepared to meet the challenge of ever-increasing technical, economic, and social problems.

Graduates are qualified for professional positions in design, analysis, manufacture, and application of machines, process, and control, or in research and development, as well as for graduate work.

CORE CURRICULUM

Normally the first four semesters are common to all undergraduate fields in the School of Engineering and Applied Science.

First Semester

EE 51: Applications of Computers (3)
Math 30: Precalculus (3)
Math 31: Calculus of One Variable (3)
Phys 3: Foundations of Physics (3)
Elective: Selected from humanities or social sciences (3)

Second Semester

EngS 4: Descriptive Geometry and Drafting (3)
Engl 9 or 10: English Composition: Language as Communication (3)
Math 32: Calculus of Several Variables (3)
Phys 14: Introductory Mechanics and Thermal Physics (3)
Elective: Selected from humanities or social sciences (3)

Third Semester

ApSc 57: Analytical Mechanics I (2)
ApSc 113: Engineering Analysis I (3)
ApSc 115: Engineering Analysis III (3)
Chem 13: General Chemistry (4)
Phys 15: Elements of Electricity and Magnetism (3)
Elective: Selected from Humanities or Social Science (3)
(May be taken during the Summer Sessions)

Fourth Semester

ApSc 58: Analytical Mechanics II (3)
ApSc 114: Engineering Analysis II (3)
CE 140: Materials Science (3)
EE 11: Linear Networks I (3)
Phys 16: Introduction to Modern Physics (3)
Elective: Selected from humanities or social sciences (3)
(May be taken during the Summer Sessions)

ECHANICAL ENGINEERING CURRICULUM

rerequisite: first four semesters as described in the Core Curriculum, see age 59.

Fifth Semester

CE 120: Introduction to the Mechanics of Solids (4)

CE 166:	Materials Engineering (2)
CE 167:	Mechanics of Materials Laboratory (1)
ME 131:	Thermodynamics (3)
ME 134:	Introduction to Vibration Analysis (3)
Elective:	Selected from humanities or social sciences (3)

Sixth Semester

EE 20:	Introductory Engineering Electronics (3)
EE 172:	Control Systems (3)
ME 120:	Methods of Engineering Experimentation (2)
ME 126:	Fluid Mechanics (3)
ME 148:	Thermodynamic Analysis (3)
Elective:	Selected from humanities or social sciences (3)

Seventh Semester

ME 155:	Compressible Fluid Flow (3)
ME 176:	Environmental Engineering Problems (3)
ME 187:	Heat Transfer Theory (3)
ME 190:	Mechanisms, Analysis and Synthesis (3)
ME 191:	Mechanical Design (3)
Elective:	Technical elective (3)

Eighth Semester

ME 152:	Mechanical Engineering Laboratory (2)
ME 193:	Engineering Systems Design (3)
ME 194:	Energy Conversion (3)
Elective:	Technical electives (6)

Technical Electives

CE 197:	Environmental Engineering II: Waste and Pollution Control (3)
EAd 150:	Introduction to Engineering Administration (3)
EAd 160:	Introduction to Engineering Economic Analysis (3)
EngS 251–52:	Transportation (3–3)
ME 215:	Theory of Vibrations (3)
ME 221:	Intermediate Fluid Mechanics (3)
ME 225:	Turbomachinery I (3)
ME 237:	Propulsion I (3)
ME 240:	Kinematic Synthesis (3)
ME 247:	Fluidics (3)

COMPUTER-ORIENTED MECHANICAL ENGINEERING OPTION

The rapidly expanding use of computers in the design and control of engineering systems provides increasing opportunities for engineering careers in which upon graduation, a high degree of proficiency and ease in the extensive and sophisticated use of digital and other computers is essential. This program therefore replaces the technical electives of the principal professional undergraduate program with electives that provide comprehensive exposure to computer applications to the solution of all problems of mechanical engineering. It prepares the student for immediate careers as well as for graduate study in computer-dominated or computer-oriented professional fields.

CURRICULUM

Prerequisite: first four semesters as described in the Core Curriculum, see page 59.

Fifth Semester

CE 120:	Introduction to the Mechanics of Solids (3)
CE 166:	Materials Engineering (2)
CE 167:	Mechanics of Materials Laboratory (1)
ME 131:	Thermodynamics (3)
ME 134:	Introduction to Vibration Analysis (3)
Elective:	Selected from humanities or social sciences (3)

Sixth Semester

EE 20:	Introductory Engineering Electronics (3)
EE 172:	Control Systems (3)
ME 120:	Methods of Engineering Experimentation (2)
ME 126:	Fluid Mechanics (3)
ME 148:	Thermodynamic Analysis (3)
Elective:	Selected from humanities or social sciences (3)

Seventh Semester

ME 155:	Compressible Fluid Flow (3)
ME 187:	Heat Transfer Theory (3)
ME 190:	Mechanisms, Analysis and Synthesis (3)
ME 191:	Mechanical Design (3)
Elective:	Technical electives (6)

Eighth Semester

ME 152:	Mechanical Engineering Laboratory (2)
ME 193:	Engineering Systems Design (3)
ME 194:	Energy Conversion (3)
Elective:	Technical electives (6)

Technical Electives

CSci 278:	Analog and Hybrid Computers (3)
EE 152:	Introduction to Digital Computers (3)
EE 157:	Machine and Assembly Language Programming (3)
EngS 282:	Computer-aided Design (3)
EngS 283:	Application of Computer Graphics in Engineering (3)
EngS 284:	Numerical Methods in Engineering (3)

ENERGY RESOURCES AND POWER OPTION

The energy resources and power option in mechanical engineering is concerned with the study of energy resources and the means of practical and economical conversion of the various forms of energy to mechanical and electrical power. Expanding demand for energy and power and the shortage of certain energy resources have confronted mechanical enigineers with new and challenging problems. The basic objective of this program is to provide the student with essential background to contribute professionally to the solution of these prob-

lems. The program provides study of a comprehensive cross-section of several fields of mechanical engineering (creative design, materials, fluids, heat transfer and energy conversion—combined with allied fields in electrical, transportation and environmental control engineering). The curriculum prepares the student for graduate study as well as for a career in energy resources and power engineering.

CURRICULUM

Prerequisite: first four semesters as described in the Core Curriculum, see page 59.

Fifth Semester

CE 120:	Introduction to the Mechanics of Solids (3)
CE 166:	Materials Engineering (2)
CE 167:	Mechanics of Materials Laboratory (1)
ME 131:	Thermodynamics (3)
ME 134:	Introduction to Vibration Analysis (3)
Elective:	Selected from humanities or social sciences (3)

Sixth Semester

EE 20:	Introductory Engineering Electronics (3)
EE 172:	Control Systems (3)
ME 120:	Methods of Engineering Experimentation (2)
ME 126:	Fluid Mechanics (3)
ME 148:	Thermodynamic Analysis (3)
Elective:	Selected from humanities or social sciences (3)

Seventh Semester

EE 177:	Electrical Energy Conversion (3)
ME 155:	Compressible Fluid Flow (3)
ME 187:	Heat Transfer Theory (3)
ME 190:	Mechanisms, Analysis and Synthesis (3)
ME 191:	Mechanical Design (3)
Elective:	Technical elective (3)

Eighth Semester

ME 152:	Mechanical Engineering Laboratory (2)
ME 193:	Engineering Systems Design (3)
Elective:	Technical electives (9)

Technical Electives

EAd 150:	Introduction to Engineering Administration (3)
EAd 160:	Introduction to Engineering Economic Analysis (3)
ME 176:	Environmental Engineering Problems (3)
ME 194:	Energy Conversion (3)
ME 224:	Fundamentals of Combustion Engines (3)
ME 225:	Turbomachinery I (3)
ME 237:	Propulsion I (3)
ME 259:	Solar Heating and Cooling Systems (3)
ME 260:	Heating, Refrigeration, and Air Conditioning (3)

ME 282: Energy Technology (3)
ME 283: Nuclear Reactor Engineering (3)
ME 291: Power Systems (3)

MECHANICAL ENGINEERING UNDERGRADUATE COURSES

120 **Methods of Engineering Experimentation** (2)

Acquisition and analysis of experimental data. Laws of modeling and simulation. Report formulation and presentation. Basic principles of various measuring instruments and sensors. Laboratory experiments, including use of strain gages, oscilloscopes, various tranducers, etc. Introduction to basic experimental techniques related to dynamics, fluid flow, and thermal sciences. Prerequisite: CE 120, ME 131. (Spring)

126 **Fluid Mechanics** (3)

Fluid properties, regimes in fluid mechanics, fluid statics, fluid kinematics, basic equations, one- and two-dimensional inviscid incompressible flow, viscous incompressible flow, dimensional method. Prerequisite: ApSc 58. (Spring)

131 **Thermodynamics** (3)

Fundamental thermodynamic concepts, Zeroth law of thermodynamics and temperature measurements, work and heat, first law of thermodynamics, properties of pure substances, first-law analysis of some thermodynamic systems, second law of thermodynamics, reversibility, entropy, second-law analysis of thermodynamic systems. Prerequisite or concurrent registration: ApSc 58. (Fall)

134 **Introduction to Vibration Analysis** (3)

Natural frequencies and response of single- and multiple-degree of freedom mechanical systems to dynamic loads. Effect of damping, transient and steady-state analysis. Prerequisite: ApSc 58. (Fall)

148 **Thermodynamic Analysis** (3)

Analysis of thermodynamic power and refrigeration cycles; thermodynamics of mixtures of substances; properties of air-water vapor mixtures; psychrometry and analysis of cooling tower and air-conditioning plant; third law of thermodynamics and absolute entropy; evaluation of combustion processes. Molecular distributions and models; introduction to statistical and quantum mechanics; statistical thermodynamics and thermodynamic properties of gases and solids. Prerequisite: ME 131. (Spring)

152 **Mechanical Engineering Laboratory** (2)

Experimental study of various engineering systems. Laboratory projects include experimental design, modeling and simulation parameters, data acquisition, and report presentation techniques. Prerequisite: ME 120. (As arranged)

155 **Compressible Fluid Flow** (3)

Introduction to compressible flow, basic equations, propagation of motion in compressible fluids, isotropic-flow relations, steady one-dimensional flow, wave phenomena, small perturbation theory, slender-body theory, method of characteristics. Prerequisite: ME 126, 131. (Fall)

176 **Environmental Engineering Problems** (3)

Classification and effects of air pollutants; air-quality criteria and standards; analysis of pollutants; sources of pollutants and emission inventory;

emission-control equipment. Water-quality standards; sewage and industrial waste characterization and pollutional effects in natural waters; primary, biological, and tertiary treatment of wastes; sludge handling and disposal. Prerequisite: senior status. (Fall)

187 Heat Transfer Theory (3)

Heat transfer processes. General heat conduction equations; steady- and unsteady-state heat conduction problems. Methods of analysis; analytical, analog, and numerical solution methods. Fundamentals of convective-heat transfer. Evaluation of convective-heat transfer coefficients; dimensional analysis, boundary-layer approach, analogy between heat and momentum transfer. Energy exchange by thermal radiation; fundamental concepts and laws, radiation properties, radiative-heat transfer between surfaces. Design considerations; heat-exchanger design and selection. Prerequisite: ME 126. (Fall)

190 Mechanisms, Analysis and Synthesis (3)

Kinematics and dynamics of mechanisms. Displacement, velocities, accelerations in linkage and cam systems by analytical and graphical methods. Prerequisite: ApSc 58. (Fall)

191 Mechanical Design (3)

Introduction to design concept, selection of materials, and strength of mechanical elements; design of machine components such as shafts, springs, bearings, gears, couplings, screws, and related mechanical components. Prerequisite: senior status. (Fall)

193 Engineering Systems Design (3)

Principles of creative design and system-design concept. Engineering economics, modeling and simulation of physical systems, optimization techniques. Analog and digital computer-aided design methods. Special design projects which may integrate with ME 152 *Mechanical Engineering Laboratory* projects. Prerequisite: ME 191. (Spring)

194 Energy Conversion (3)

Energy resources of the earth; energy, society, and the national economy; issue of energy and the environment, future outlook for energy supply and demand. Conversion of energy; fundamental principles and technological options, efficiency of different energy converters. Current technologies and longer-range possibilities. Generation of electricity, trends in the electricity industry; nuclear power systems—growth, economic, and environmental impacts. Unconventional methods of power generation; direct energy conversion. Prerequisite: EE 20, ME 148. (Spring)

198 Research (1 to 3)

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

ENGINEERING SCIENCE—UNDERGRADUATE COURSE

4 Descriptive Geometry and Drafting (3)

Introductory descriptive geometry. Use of equipment. Points, lines, curves, planes, and surfaces; principal, auxiliary, and orthographic views;

isometric views, intersection of surface. Technical sketching, dimensions and precision, machine elements. Detail and assembly drawings. Structural elements. Layout and fabrication drawings, pipe and electric prints. (Spring)

GRADUATE STUDY

Dynamic developments in science and technology in decades to come will require that the engineer keep pace with newly emerging technological disciplines, as well as with new techniques in analysis, design, and computation. Under these circumstances, it is evident that graduate education in advanced technology will assume a vital responsibility in answering the needs of a technologically oriented society. Amidst the proliferation of knowledge and technological specialty, the School adheres to the principle that versatility and depth in scientific fundamentals should be the characteristic features of any graduate program of study that attempts to prepare the graduate student to cope with the engineering developments of today and of the future.

The Department of Civil, Mechanical, and Environmental Engineering offers graduate programs of study in the various areas of concentration in the professional disciplines of civil and mechanical engineering. Its professional as well as basic interdisciplinary programs encompass the broad areas of solid mechanics, structural engineering, geotechnics and foundation engineering, ocean and marine engineering, public works engineering, urban environmental engineering, risk assessment and assurance technology, structures and dynamics, flight sciences, mechanical engineering design, environmental control, energy and power, transportation engineering, thermal sciences, materials engineering, hydromechanics, fluid mechanics, and aerospace engineering. Within these broad categories are basic programs of study and research in the elasticity, inelasticity, and fracture of solids; the mechanics of continua; the structure and properties of materials; the theory of plates, shells, and elastic stability; advanced structural analysis and design, including structural reliability; structural dynamics; soil mechanics; classical and statistical thermodynamics; heat and mass transfer; energy conversion; combustion processes; incompressible, compressible, laminar, viscous, turbulent, hypersonic, and nonsteady flows; hydrodynamics and oceanography; gas dynamics and reaction kinetics; analytical and nonlinear mechanics; advanced dynamics; atmospheric space flight and celestial mechanics; dynamic stability of flight structures; propulsion systems; and aerothermochemistry. As part of the interdisciplinary program, students elect approved courses from other departments of the School of Engineering and Applied Science, as well as from other schools and divisions of the University. Depending upon the interest of the student, some of the programs leading to the degrees of Master of Science and (by special permission of the appropriate department chairman) Doctor of Science are given at the NASA-Langley Research Center, Langley Station, Hampton, Va. NASA-Langley's extensive scientific and engineering facilities and equipment are utilized whenever feasible. Arrangements can also be made to use the facilities and equipment of the Naval Ship Research and Development Center, Annapolis and Carderock, Md., where off-campus Master's degree programs have been initiated.

Each program is arranged to fit the individual needs and interests of the

graduate student, and at the same time to utilize effectively his previous experience and background. This background should normally include an undergraduate degree in engineering, the physical sciences, or applied mathematics. Each graduate student is assigned a faculty adviser on the basis of his study interests, thereby enabling a close student-faculty relationship to develop during the course of his program.

FIELDS AND AREA OF CONCENTRATION

Programs of study in any field of concentration will generally include courses from appropriate allied areas.

Acoustics*

ApSc 211:	Analytical Methods in Engineering I
ApSc 212:	Analytical Methods in Engineering II
ApSc 213:	Analytical Methods in Engineering III
ApSc 215:	Analytical Methods in Engineering V
ApSc 216:	Special Topics in Engineering Analysis
*EngS 203–4:	Probability and Statistics of Metrology
EngS 217:	Analytical Mechanics
EngS 270:	Introduction to Acoustics
*EngS 271:	Random Process Theory I
*EngS 272:	Random Process Theory II
*EngS 273:	Time Series Analysis
EngS 274:	Noise and Vibration Control
*EngS 275:	Advanced Theoretical Acoustics
*EngS 276:	Acoustical and Mechanical Measurements
*EngS 277:	Physical Acoustics
*EngS 278:	Psychological and Physiological Acoustics
*EngS 279:	Human Factors in Engineering
*EngS 280:	Special Topics in Acoustics
EngS 298:	Research
EngS 299–300:	Thesis Research
*EngS 310:	Aeroacoustics
*EngS 311:	Nonlinear Acoustics
*EngS 312:	Theory of Random Vibration
*EngS 313:	Structural Acoustic Interaction
EngS 398:	Advanced Reading and Research
EngS 399:	Dissertation Research
ME 215:	Theory of Vibrations
ME 216:	Structural Dynamics
ME 221:	Intermediate Fluid Mechanics
ME 312:	Theory of Turbulence

Aerospace Engineering*

ApSc 211:	Analytical Methods in Engineering I
ApSc 212:	Analytical Methods in Engineering II
ApSc 213:	Analytical Methods in Engineering III
ApSc 214:	Analytical Methods in Engineering IV
ApSc 215:	Analytical Methods in Engineering V
ApSc 216:	Special Topics in Engineering Analysis
*EngS 263:	Atmospheric Physics for Engineers I

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

*EngS 264:	Atmospheric Physics for Engineers II
*EngS 273:	Time Series Analysis
ME 221:	Intermediate Fluid Mechanics
ME 222:	Applied Fluid Dynamics
ME 235:	Compressible Flow
*ME 248:	Seminar: Aircraft Design
ME 275:	Stability and Control of Vehicles
*ME 276:	Mechanics of Space Flight
ME 283:	Nuclear Reactor Engineering
ME 298:	Research
ME 299–300:	Thesis Research
ME 398:	Advanced Reading and Research
ME 399:	Dissertation Research

Computer-oriented Engineering Design (or Structures and Dynamics†)

ApSc 211:	Analytical Methods in Engineering I
ApSc 212:	Analytical Methods in Engineering II
ApSc 213:	Analytical Methods in Engineering III
ApSc 214:	Analytical Methods in Engineering IV
ApSc 215:	Analytical Methods in Engineering V
ApSc 216:	Special Topics in Engineering Analysis
CE 210:	Methods of Structural Analysis
CE 214:	Advanced Strength of Materials
CE 253:	Failure and Reliability Analysis of Engineering Structures
CE 254:	Special Topics in Structural Engineering
CE 261:	Analysis of Plates and Shells
CE 263:	Theory of Structural Stability
EE 157:	Machine and Assembly Language Programming
EngS 221:	Theory of Elasticity I
EngS 222:	Theory of Elasticity II
EngS 234:	Composite Materials
EngS 282:	Computer-aided Design
EngS 283:	Application of Computer Graphics in Engineering
EngS 284:	Numerical Methods in Engineering
EngS 285:	Finite Element Methods in Engineering Mechanics
*EngS 286:	Analysis and Design of Thin-walled Structures
*EngS 287:	Automated Design of Complex Structures
EngS 288:	Advanced Finite Element Methods in Structural Mechanics
EngS 299–300:	Thesis Research
EngS 314:	Advanced Numerical Methods in Engineering
EngS 398:	Advanced Reading and Research
EngS 399:	Dissertation Research
ME 215:	Theory of Vibrations
ME 216:	Structural Dynamics
OR 251:	Linear Programming
OR 252:	Nonlinear Programming

Energy and Power

ApSc 211:	Analytical Methods in Engineering I
ApSc 213:	Analytical Methods in Engineering III
ApSc 215:	Analytical Methods in Engineering V
EE 133:	Electromagnetic Waves

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.
† Offered at NASA-Langley Research Center as Structures and Dynamics Program.

EE 236: Plasma Dynamics
ME 221: Intermediate Fluid Mechanics
ME 224: Fundamentals of Combustion Engines
ME 225: Turbomachinery I
ME 226: Turbomachinery II
ME 227: Viscous Flow
ME 235: Compressible Flow
ME 237: Propulsion I
ME 238: Propulsion II
ME 259: Solar Heating and Cooling Systems
ME 260: Heating, Refrigeration, and Air Conditioning
ME 281: Nonequilibrium Thermodynamics
ME 282: Energy Technology
ME 283: Nuclear Reactor Engineering
ME 287: Heat Conduction
ME 288: Convective Heat and Mass Transfer
ME 291–92: Power Systems
ME 298: Research
ME 299–300: Thesis Research
ME 398: Advanced Reading and Research
ME 399: Dissertation Research

Environmental Control

ApSc 213: Analytical Methods in Engineering III
CE 211: Waste Water Treatment
CE 216: Advanced Hydrology
CE 217: Water Resources Engineering I
CE 218: Water Resources Engineering II
CE 219: Groundwater and Seepage
CE 242: Solid Waste Disposal
CE 243: Environmental Impact Assessment
CE 276: Water Resources Planning and Control
EAd 221–22: Environmental Management
EngS 270: Introduction to Acoustics
EngS 274: Noise and Vibration Control
ME 221: Intermediate Fluid Mechanics
ME 224: Fundamentals of Combustion Engines
ME 225: Turbomachinery I
ME 226: Turbomachinery II
ME 260: Heating, Refrigeration, and Air Conditioning
ME 261: Fundamentals of Environmental Control I
ME 262: Fundamentals of Environmental Control II
ME 263: Environmental Control Processes I
ME 264: Environmental Control Processes II
ME 265: Air-pollution Meteorology
ME 266: Experimental Methods for Environmental Control
ME 282: Energy Technology
ME 288: Convective Heat and Mass Transfer
ME 291–92: Power Systems
ME 298: Research
ME 299–300: Thesis Research
ME 398: Advanced Reading and Research
ME 399: Dissertation Research

Environmental Modeling*

ApSc 211: Analytical Methods in Engineering I
ApSc 213: Analytical Methods in Engineering III
EngS 263: Atmospheric Physics for Engineers I
EngS 264: Atmospheric Physics for Engineers II
EngS 284: Numerical Methods in Engineering
EngS 298: Research
EngS 299–300: Thesis Research
EngS 314: Advanced Numerical Methods in Engineering
EngS 398: Advanced Reading and Research
EngS 399: Dissertation Research
ME 221: Intermediate Fluid Mechanics
ME 227: Viscous Flow
ME 231: Hydrodynamics
ME 265: Air-pollution Meteorology
ME 282: Energy Technology
ME 285: Reaction Kinetics
ME 288: Convective Heat and Mass Transfer
ME 289: Radiative Heat Transfer
ME 296: Special Topics in Heat and Mass Transfer
ME 312: Theory of Turbulence

Flight Sciences*

ApSc 211: Analytical Methods in Engineering I
ApSc 213: Analytical Methods in Engineering III
ApSc 215: Analytical Methods in Engineering V
ApSc 216: Special Topics in Engineering Analysis
EngS 217: Analytical Mechanics
EngS 284: Numerical Methods in Engineering
ME 215: Theory of Vibrations
ME 221: Intermediate Fluid Mechanics
ME 222: Applied Fluid Dynamics
ME 223: Aeroelasticity
ME 227: Viscous Flow
ME 235: Compressible Flow
*ME 248: Seminar: Aircraft Design I
*ME 249: Seminar: Aircraft Design II
*ME 270: Aerodynamics of Flight Vehicles
*ME 271: VTOL Aircraft Technology
*ME 272: STOL Aircraft Technology
*ME 273: Principles of Automatic Flight Control
*ME 274: Principles of Flight Guidance
ME 275: Stability and Control of Vehicles
*ME 279: Special Topics in Flight Sciences
ME 298: Research
ME 299–300: Thesis Research
ME 312: Theory of Turbulence
ME 315: Hypersonic Flow
ME 398: Advanced Reading and Research
ME 399: Dissertation Research

*Offered at NASA-Langley Research Center; may be offered on campus when arranged.

Fluid Mechanics and Thermal Sciences

ApSc 211:	Analytical Methods in Engineering I
ApSc 212:	Analytical Methods in Engineering II
ApSc 213:	Analytical Methods in Engineering III
ApSc 214:	Analytical Methods in Engineering IV
ApSc 215:	Analytical Methods in Engineering V
ApSc 216:	Special Topics in Engineering Analysis
CE 256:	Introduction to Ocean and Coastal Engineering
CE 259:	Theory of Ship Motions and Sea Loads
CE 274:	Mechanics of Water Waves
CE 275:	Special Topics in Ocean Engineering
EE 133:	Electromagetic Waves
EE 236:	Plasma Dynamics
EngS 228:	Physical Oceanography
ME 218:	Design of Floating and Submerged Marine Vehicles
ME 221:	Intermediate Fluid Mechanics
ME 222:	Applied Fluid Dynamics
ME 223:	Aeroelasticity
ME 227:	Viscous Flow
ME 231:	Hydrodynamics
ME 235:	Compressible Flow
ME 280:	Advanced Thermodynamics
ME 281:	Nonequilibrium Thermodynamics
ME 282:	Energy Technology
ME 287:	Heat Conduction
ME 288:	Convective Heat and Mass Transfer
ME 289:	Radiative Heat Transfer
ME 291–92:	Power Systems
ME 295:	Statistical Thermodynamics
ME 297:	Special Topics in Fluid Mechanics
ME 298:	Research
ME 299–300:	Thesis Research
ME 310:	Mechanics of Non-Newtonian Fluids
ME 311:	Nonsteady Flow
ME 312:	Theory of Turbulence
ME 315:	Hypersonic Flow
ME 317:	Physical Gas Dynamics
ME 398:	Advanced Reading and Research
ME 399:	Dissertation Research

Geotechnics and Foundation Engineering

ApSc 213:	Analytical Methods in Engineering III
CE 204:	Applied Soil Mechanics I
CE 205:	Applied Soil Mechanics II
CE 206:	Foundation Engineering
CE 207:	Soil Dynamics
CE 208:	Rock and Ice Mechanics
CE 209:	Theoretical Soil Mechanics
CE 217:	Water Resources Engineering I
CE 218:	Water Resources Engineering II
CE 219:	Groundwater and Seepage
CE 221:	Pavement and Runway Design
CE 256:	Introduction to Ocean and Coastal Engineering
CE 257:	Harbor and Coastal Engineering I
CE 265:	Special Topics in Geotechnical Engineering

CE 298: Research
CE 299–300: Thesis Research
CE 398: Advanced Reading and Research
CE 399: Dissertation Research
EngS 221: Theory of Elasticity I
EngS 256: Introduction to the Theories of Inelastic Media
EngS 285: Finite Element Methods in Engineering Mechanics
*Geol 128: Geomorphology
*Geol 163: Sedimentation
*Geol 189: Geophysics of the Solid Earth
*Geol 224: Advanced Structural Geology

Hydromechanics

ApSc 211: Analytical Methods in Engineering I
ApSc 212: Analytical Methods in Engineering II
ApSc 213: Analytical Methods in Engineering III
ApSc 214: Analytical Methods in Engineering IV
ApSc 215: Analytical Methods in Engineering V
ApSc 216: Special Topics in Engineering Analysis
CE 216: Advanced Hydrology
CE 255: Coastal Processes
CE 256: Introduction to Ocean and Coastal Engineering
CE 259: Theory of Ship Motions and Sea Loads
CE 274: Mechanics of Water Waves
CE 275: Special Topics in Ocean Engineering
CE 298: Research
CE 299–300: Thesis Research
CE 398: Advanced Reading and Research
CE 399: Dissertation Research
EE 236: Plasma Dynamics
EngS 228: Physical Oceanography
EngS 284: Numerical Methods in Engineering
ME 218: Design of Floating and Submerged Marine Vehicles
ME 221: Intermediate Fluid Mechanics
ME 222: Applied Fluid Dynamics
ME 227: Viscous Flow
ME 231: Hydrodynamics
ME 297: Special Topics in Fluid Mechanics
ME 310: Mechanics of Non-Newtonian Fluids
ME 311: Nonsteady Flow

Mechanical Engineering Design

CSci 284: Applications of Numerical Methods
EngS 217: Analytical Mechanics
EngS 251–52: Transportation
EngS 282: Computer-aided Design
EngS 283: Application of Computer Graphics in Engineering
ME 214: Advanced Strength of Materials
ME 218: Design of Floating and Submerged Marine Vehicles
ME 221: Intermediate Fluid Mechanics
ME 225: Turbomachinery I
ME 226: Turbomachinery II
ME 240: Kinematic Synthesis

*For Geology course descriptions, see the *Undergraduate and Graduate Catalogue*.

ME 241: Engineering Systems Design
ME 243: Advanced Mechanical Engineering Design
ME 246: Electromechanical Control Systems
ME 247: Fluidics
ME 250: Energy Systems Design
ME 298: Research
ME 299–300: Thesis Research
ME 298: Research
ME 299–300: Thesis Research

Ocean, Marine, and Coastal Engineering

ApSc 211: Analytical Methods in Engineering I
ApSc 213: Analytical Methods in Engineering III
ApSc 215: Analytical Methods in Engineering V
ApSc 216: Special Topics in Engineering Analysis
CE 203: Prestressed Concrete Structures
CE 206: Foundation Engineering
CE 208: Rock and Ice Mechanics
CE 217: Water Resources Engineering I
CE 218: Water Resources Engineering II
CE 219: Groundwater and Seepage
CE 253: Failure and Reliability Analysis of Engineering Structures
CE 255: Coastal Processes
CE 256: Introduction to Ocean and Coastal Engineering
CE 257: Harbor and Coastal Engineering I
CE 258: Harbor and Coastal Engineering II
CE 259: Theory of Ship Motions and Sea Loads
CE 260: Random Processes in Ocean and Coastal Engineering
CE 265: Special Topics in Geotechnical Engineering
CE 274: Mechanics of Water Waves
CE 275: Special Topics in Ocean Engineering
CE 298: Research
CE 299–300: Thesis Research
CE 398: Advanced Reading and Research
CE 399: Dissertation Research
EngS 209: Technical and Environmental Risk Assessment, Control, and Insurance
EngS 228: Physical Oceanography
*Geol 181: General Oceanography
ME 218: Design of Floating and Submerged Marine Vehicles
ME 231: Hydrodynamics

Public Works Engineering

CE 201: Design of Metal Structures
CE 202: Design of Reinforced Concrete Structures
CE 203: Prestressed Concrete Structures
CE 206: Foundation Engineering
CE 208: Rock and Ice Mechanics
CE 211: Waste Water Treatment
CE 215: Urban Construction Technology
CE 216: Advanced Hydrology
CE 217: Water Resources Engineering I

* For Geology course descriptions, see the *Undergraduate and Graduate Catalogue.*

CE 218: Water Resources Engineering II
CE 220: Urban Transportation Engineering
CE 221: Pavement and Runway Design
CE 242: Solid Waste Disposal
CE 243: Environmental Impact Assessment
CE 250: Advanced Metal Structures
CE 251: Advanced Reinforced Concrete Structures
CE 253: Failure and Reliability Analysis of Engineering Structures
CE 255: Coastal Processes
CE 256: Introduction to Ocean and Coastal Engineering
CE 257: Harbor and Coastal Engineering I
CE 258: Harbor and Coastal Engineering II
CE 276: Water Resources Planning and Control
EAd 204: Administration of Engineering Contracts
EAd 210: Engineering Law
EAd 241: Construction Management I
EAd 242: Construction Management II
EAd 243: Construction Management III
EAd 261: Economic Analysis in Engineering Planning
EngS 209: Technical and Environmental Risk Assessment, Control, and Insurance

Risk Assessment and Assurance Technology

Prerequisite: ApSc 115, Stat 191.* At least five courses must be selected from those listed under the Department of Civil, Mechanical, and Environmental Engineering; at least three from those listed under Operations Research; and at least one from those listed under Economics. Courses marked with the dagger symbol (†) are required of all students. The selection of elective courses depends on the emphasis for specific technological areas.

Civil, Mechanical, and Environmental Engineering

CE 223: Traffic Engineering
†CE 253: Failure and Reliability Analysis of Engineering Structures
CE 254: Special Topics in Structural Engineering
CE 256: Introduction to Ocean and Coastal Engineering
CE 260: Random Processes in Ocean and Coastal Engineering
CE 299–300: Thesis Research
EngS 209: Technical and Environmental Risk Assessment, Control, and Insurance
EngS 240: Fracture Mechanics
EngS 241: Fatigue and Failure of Materials
ME 261: Fundamentals of Environmental Control I

Operations Research

OR 261: Theory of Games
†OR 271: Forecasting Techniques
†OR 281: Reliability Theory I
†OR 361: Games, Decisions, and Value Theory
OR 381: Reliability Theory II

*Economics**

Econ 217–18: Survey of Economics
Econ 275: Econometrics I: Introduction
Econ 315: Seminar: Topics in Mathematical Economics

*For Economics and Statistics course descriptions, see the *Undergraduate and Graduate Catalogue*.

Solid Mechanics and Materials Engineering

ApSc 211:	Analytical Methods in Engineering I
ApSc 212:	Analytical Methods in Engineering II
ApSc 213:	Analytical Methods in Engineering III
ApSc 214:	Analytical Methods in Engineering IV
ApSc 215:	Analytical Methods in Engineering V
ApSc 216:	Special Topics in Engineering Analysis
CE 207:	Soil Dynamics
CE 208:	Rock and Ice Mechanics
CE 209:	Theoretical Soil Mechanics
CE 214:	Advanced Strength of Materials
CE 252:	General Structural Dynamics
CE 253:	Failure and Reliability Analysis of Engineering Structures
CE 254:	Special Topics in Structural Engineering
CE 261:	Analysis of Plates and Shells
CE 263:	Theory of Structural Stability
EngS 221:	Theory of Elasticity I
EngS 222:	Theory of Elasticity II
EngS 231:	Solid State for Engineers
EngS 232:	Advanced Materials Science
EngS 233:	Superconductivity and Electron Transport
EngS 234:	Composite Materials
EngS 235:	Physical Metallurgy
EngS 240:	Fracture Mechanics
EngS 241:	Fatigue and Failure of Materials
EngS 242:	Materials Recycling and Recovery
EngS 256:	Introduction to the Theories of Inelastic Media
EngS 284:	Numerical Methods in Engineering
EngS 285:	Finite Element Methods in Engineering Mechanics
EngS 288:	Advanced Finite Element Methods in Structural Mechanics
EngS 298:	Research
EngS 299–300:	Thesis Research
EngS 398:	Advanced Reading and Research
EngS 399:	Dissertation Research
ME 215:	Theory of Vibrations
ME 216:	Structural Dynamics
ME 221:	Intermediate Fluid Mechanics
ME 280:	Advanced Thermodynamics
ME 281:	Nonequilibrium Thermodynamics
ME 295:	Statistical Thermodynamics
ME 310:	Mechanics of Non-Newtonian Fluids

Structural Engineering

ApSc 212:	Analytical Methods in Engineering II
ApSc 213:	Analytical Methods in Engineering III
ApSc 214:	Analytical Methods in Engineering IV
CE 201:	Design of Metal Structures
CE 202:	Design of Reinforced Concrete Structures
CE 203:	Prestressed Concrete Structures
CE 206:	Foundation Engineering
CE 210:	Methods of Structural Analysis
CE 214:	Advanced Strength of Materials
CE 215:	Urban Construction Technology
CE 250:	Advanced Metal Structures
CE 251:	Advanced Reinforced Concrete Structures

CE 252: General Structural Dynamics
CE 253: Failure and Reliability Analysis of Engineering Structures
CE 254: Special Topics in Structural Engineering
CE 256: Introduction to Ocean and Coastal Engineering
CE 257: Harbor and Coastal Engineering I
CE 258: Harbor and Coastal Engineering II
CE 261: Analysis of Plates and Shells
CE 262: Design of Plate and Shell Structures
CE 263: Theory of Structural Stability
CE 298: Research
CE 299–300: Thesis Research
CE 398: Advanced Reading and Research
CE 399: Dissertation Research
EngS 221: Theory of Elasticity I
EngS 234: Composite Materials
EngS 240: Fracture Mechanics
EngS 241: Fatigue and Fracture of Materials
EngS 256: Introduction to the Theories of Inelastic Media
EngS 282: Computer-aided Design
EngS 283: Application of Computer Graphics in Engineering
EngS 284: Numerical Methods in Engineering
EngS 285: Finite Element Methods in Engineering Mechanics
EngS 288: Advanced Finite Element Methods in Structural Mechanics

Transportation Engineering

OPTION I: TECHNOLOGY OF THE VEHICLE

CE 201: Design of Metal Structures
CE 210: Methods of Structural Analysis
CE 220: Urban Transportation Engineering
CE 252: General Structural Dynamics
CE 253: Failure and Reliability Analysis of Engineering Structures
CE 259: Theory of Ship Motions and Sea Loads
CE 260: Random Processes in Ocean and Coastal Engineering
CE 261: Analysis of Plates and Shells
CE 263: Theory of Structural Stability
EngS 241: Fatigue and Fracture of Materials
EngS 251–52: Transportation
ME 215: Theory of Vibrations
ME 218: Design of Floating and Submerged Marine Vehicles
ME 222: Applied Fluid Dynamics
ME 223: Aeroelasticity
ME 225: Turbomachinery I
ME 226: Turbomachinery II
ME 237: Propulsion I
ME 238: Propulsion II
ME 241: Engineering Systems Design
ME 243: Advanced Mechanical Engineering Design
ME 246: Electromechanical Control Systems
ME 250: Energy Systems Design
ME 255–56: Urban Transportation Technology
ME 275: Stability and Control of Vehicles
ME 286: Special Topics in Mechanical Engineering
ME 298: Research
ME 299–300: Thesis Research

ME 398:	Advanced Reading and Research
ME 399:	Dissertation Research
*U&RP 208:	Urban Transportation Planning
*U&RP 209:	Urban Transportation Models

OPTION II: THE WAY (ROUTE STRUCTURES AND FACILITIES)

CE 201:	Design of Metal Structures
CE 202:	Design of Reinforced Concrete Structures
CE 203:	Prestressed Concrete Structures
CE 204:	Applied Soil Mechanics I
CE 205:	Applied Soil Mechanics II
CE 206:	Foundation Engineering
CE 207:	Soil Dynamics
CE 209:	Theoretical Soil Mechanics
CE 210:	Methods of Structural Analysis
CE 219:	Groundwater and Seepage
CE 220:	Urban Transportation Engineering
CE 221:	Pavement and Runway Design
CE 222:	Stations and Terminals
CE 223:	Traffic Engineering
CE 250:	Advanced Metal Structures
CE 251:	Advanced Reinforced Concrete Structures
CE 252:	General Structural Dynamics
CE 253:	Failure and Reliability Analysis of Engineering Structures
CE 255:	Coastal Processes
CE 256:	Introduction to Ocean and Coastal Engineering
CE 257:	Harbor and Coastal Engineering I
CE 258:	Harbor and Coastal Engineering II
EngS 240:	Fracture Mechanics
EngS 241:	Fatigue and Failure of Materials
EngS 251–52:	Transportation
EngS 298:	Research
EngS 299–300:	Thesis Research
EngS 398:	Advanced Reading and Research
EngS 399:	Dissertation Research
ME 255–56:	Urban Transportation Technology
OR 231:	Theory of Traffic Flow
*U&RP 208:	Urban Transportation Planning
*U&RP 209:	Urban Transportation Models

OPTION III: TRANSPORTATION SYSTEMS†

CE 220:	Urban Transportation Engineering
CE 223:	Traffic Engineering
EAd 281–82:	Systems Analysis and Management
EngS 209:	Technical and Environmental Risk Assessment, Control, and Insurance
EngS 251–52:	Transportation
‡Law 349:	Local Government Law
‡Law 372:	Administrative Law
‡Law 407:	Seminar: Regulation of Transportation I

* For Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Catalogue*.

† Prerequisite courses for admission to this option are ApSc 115 and Stat 191 (see the *Undergraduate and Graduate Catalogue*).

‡ For Law course descriptions, see the *National Law Center Catalogue*.

*Law 408: Seminar: Regulation of Transportation II
*Law 492: Seminar: Science and the Legal Process
*Law 501: Land Development Law
*Law 505: Intergovernmental Relations I
*Law 506: Intergovernmental Relations II
ME 255–56: Urban Transportation Technology
ME 298: Research
ME 299–300: Thesis Research
ME 398: Advanced Reading and Research
ME 399: Dissertation Research
OR 201: Survey of Operations Research Methods I
OR 231: Theory of Traffic Flow
OR 251: Linear Programming
OR 252: Nonlinear Programming
OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation
OR 277: Queuing Theory
†U&RP 201: Introduction to Urban Planning
†U&RP 206: Community Facilities Planning
†U&RP 208: Urban Transportation Planning
†U&RP 209: Urban Transportation Models

Urban Environmental Engineering

CE 201: Design of Metal Structures
CE 202: Design of Reinforced Concrete Structures
CE 203: Prestressed Concrete Structures
CE 204: Applied Soil Mechanics I
CE 206: Foundation Engineering
CE 211: Waste Water Treatment
CE 215: Urban Construction Technology
CE 216: Advanced Hydrology
CE 217: Water Resources Engineering I
CE 218: Water Resources Engineering II
CE 219: Groundwater and Seepage
CE 220: Urban Transportation Engineering
CE 223: Traffic Engineering
CE 240: Environmental Microbiology
CE 241: Environmental Chemistry
CE 242: Solid Waste Disposal
CE 243: Environmental Impact Assessment
CE 272: Advanced Waste Treatment Process Design
CE 276: Water Resources Planning and Control
CE 298: Research
CE 299–300: Thesis Research
CE 398: Advanced Reading and Research
CE 399: Dissertation Research
EAd 204: Administration of Engineering Contracts
EAd 207: The Personnel Function for Engineering Administrators
EAd 210: Engineering Law
EAd 261: Economic Analysis in Engineering Planning
EngS 209: Technical and Environmental Risk Assessment, Control, and Insurance
EngS 251–52: Transportation

* For Law course descriptions, see the *National Law Center Catalogue.*
† For Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Catalogue.*

ME 255–56: Urban Transportation Technology
ME 261: Fundamentals of Environmental Control I
ME 262: Fundamentals of Environmental Control II
ME 263: Environmental Control Processes I
*U&RP 204: Urban Development Planning
*U&RP 205: Urban Housing
*U&RP 207: Land Development Planning
*U&RP 208: Urban Transportation Planning

CIVIL ENGINEERING COURSES

201 **Design of Metal Structures** (3)
Structural behavior of metal structures, conception and design of advanced structural components and systems, hysteretic behavior, plastic design principles, box type girders, cable systems, composite girders, and special topics. Prerequisite: CE 191 or equivalent. (Spring)

202 **Design of Reinforced Concrete Structures** (3)
Structural behavior of reinforced concrete structures, conception and design of structural components, prestressed concrete, slabs, ultimate strength and deformation, box type girders, hysteretic behavior, safety considerations, and special topics. Prerequisite: CE 192 or equivalent. (Fall)

203 **Prestressed Concrete Structures** (3)
Structural behavior and failure modes of prestressed concrete structures; design in prestressed concrete, including long-span structures, bridges, and precast systems. Prerequisite: CE 202 or equivalent. (Spring)

204 **Applied Soil Mechanics I** (3)
Theories of soil strength; bearing capacity of shallow foundations and their design; deep foundations, including pile types and design criteria; theories of lateral earth pressure with applications; stability analyses of slopes. Selected experiments in the soil mechanics laboratory. Prerequisite: CE 168 or equivalent. (Spring)

205 **Applied Soil Mechanics II** (3)
Nature of soil, including geological and pedological aspects; flow of water in soil; seepage involving foundations, dams, and wells; stress distribution in earth masses; one- and three-dimensional theories of consolidation; analysis of settlement. Selected experiments in the soil mechanics laboratory. Prerequisite: approval of Department. (Fall)

206 **Foundation Engineering** (3)
Principles of soil mechanics and structural mechanics applied to the analysis and design of spread footings and mat foundations, pile foundations, retaining structures, including sheeting and bracing systems, and waterfront structures. Problems associated with subsurface exploration, dewatering excavations, and underpinning. Prerequisite: CE 204 or 205 or equivalent. (Spring)

207 **Soil Dynamics** (3)
Stress-strain behavior of soil under transient and repeated loads, effects of earthquakes upon foundations and earth dams, design of machinery foundations. Prerequisite: CE 204. (As arranged)

* For Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Catalogue.*

208 Rock and Ice Mechanics (3)

Classification, composition, and structure of rocks; elastic and rheological properties; fracture; effect of hydrostatic pressure and temperature; effect of water; strain measurement and testing. Composition and structure of ice; deformation, flow and fracture. Engineering, geophysical, and geological applications. Prerequisite: graduate status and approval of Department. (As arranged)

209 Theoretical Soil Mechanics (3)

Advanced theories of consolidation. Yield condition in soils. Application of theories of plasticity in soil mechanics. Elements of wave propagation in soils, including surface waves. Prerequisite: ApSc 213, CE 204 or 205. (As arranged)

210 Methods of Structural Analysis (3)

Modern methods of analysis of statically indeterminate structures, matrix analysis based on flexibility, stiffness, energy and variational methods, substructuring techniques; consideration of plastic collapse of structures; introduction to the finite element method. Prerequisite: graduate status. (Fall)

211 Waste Water Treatment (3)

Characteristics of waste, some important pollution indicators, fundamentals of biochemical engineering for waste control, physical unit operations, chemical and biological unit processes, design of treatment facilities. Prerequisite: CE 197 or equivalent. (Fall)

214 Advanced Strength of Materials (3)

Advanced problems of stress and strength analysis of structural and machine elements: bending, torsion, and buckling of thin-walled structures. Curved beams, stress-concentration, thermal stresses, creep instability and stress relaxation, contact problems, composite elements. Prerequisite: CE 120 or equivalent. (Spring)

215 Urban Construction Technology (3)

Precedents and contemporary trends in urban housing, building, and planning technology. Prerequisite: approval of Department. (Spring)

216 Advanced Hydrology (3)

Precipitation, evaporation, and transpiration. Soil physics; stream flow, drainage basins, hydrograph analysis, and stream-flow routing. Design criteria, flood frequency statistics and analysis, flood forecasting and control, water supply forecasting. Prerequisite: CE 195 or equivalent. (Spring)

217 Water Resources Engineering I (3)

Hydrology; open-channel flow with application to navigation, irrigation, water power; water supply and distribution. Prerequisite: ApSc 114, CE 193; or equivalent. (Fall)

218 Water Resources Engineering II (3)

Groundwater; pollution and sanitation in sewers, lakes, estuaries; water-resources planning; special problems. Prerequisite: CE 217 or equivalent. (Spring)

219 Groundwater and Seepage (3)

Permeability theory or groundwater flow, flownets, analogs, computer so lutions; applications to engineering problems such as excavation dewater ing, flow through dams, stabilization of earth slopes. Prerequisite: ApS 211 and concurrent registration in ApSc 213. (Fall)

220 Urban Transportation Engineering (3)

Introduction to urban transportation planning. Analysis of urban trans portation requirements. Evaluation procedure for the selection between alternative solutions. Prerequisite: approval of Department. (Fall

221 Pavement and Runway Design (3)

Pavement types, wheel-load characteristics; stresses in pavements and sub grades; empirical methods of design of flexible and rigid highway and air field pavements; general principles of runway design. Prerequisite: CE 202, CE 204 or CE 205. (Spring)

222 Stations and Terminals (3)

Unified treatment of the functions and operation of stations and terminals of transportation systems; emphasis on specifications and planning criteria. Problems of locating the facility, passenger and freight handling, intra modal and inter-modal interfacing, communication and control. Illustra tions include railroad and subway stations, bus terminals, airports, and harbors. Prerequisite: approval of Department. (Spring)

223 Traffic Engineering (3)

Lane capacity and other traffic system performance measures; methods of characterizing steady and unsteady traffic flow phenomena; traffic monitor ing techniques, instruments, and data processing; bottleneck dynamics; traffic signalization; one-way street operation; reserved transit lanes; vehicle dynamics and road geometry; approaches to automatic control of unlim ted space and limited-access road traffic systems. Prerequisite: approval of Department. (Fall)

240 Environmental Microbiology (3)

Basic cellular organizations and processes related to waste treatment; microorganisms as disease carrying agents in natural and waste water; laboratory tests for coliform organisms and viruses, and analysis of acti vated sludge. (Fall)

241 Environmental Chemistry (3)

Chemical composition and chemical analysis of water; chemical treatment of water and waste water; laboratory tests of solids, BOD, COD, phos phorus, nitrogen, etc., as related to water quality. (Spring)

242 Solid Waste Disposal (3)

Characteristics of solid waste; collection, transportation, and disposal prac tices; regional planning and management; resource and energy recovery from solid waste. Prerequisite: approval of Department. (Fall)

243 Environmental Impact Assessment (3)

Public policy and legislation at federal, state, and local levels concerning quality of the environment. Strategies and methodologies which have been developed to assess impact of engineering projects. Technology of assess ing impact on air and water quality and on land use, applied to transpor

tation facilities, water supply and pollution control facilities, and industrial and community development. Prerequisite: approval of Department. (Fall)

250 Advanced Metal Structures (3)

Conception, analysis, and design of low-rise and high-rise buildings by elastic and inelastic methods, suspended roofs, earthquake considerations, and unique structural systems. Prerequisite: CE 201 or equivalent. (Fall)

251 Advanced Reinforced Concrete Structures (3)

Conception, analysis, and design of low-rise and high-rise buildings by ultimate strength methods, precast systems, progressive collapse, earthquake considerations, domes, folded plates, shell-type structures and special topics. Prerequisite: CE 202 or equivalent. (Spring)

252 General Structural Dynamics (3)

Analysis of elastic structures under dynamic loadings—steady-state, transient, and stochastic; vibrations of rigid frames, plates, and thin shells. Stochastic load processes—wind, earthquake, sea; failure under stochastic loading—first exceedance, damage accumulation. Prerequisite: ApSc 115, CE 210; or equivalent and approval of Department. (Spring)

253 Failure and Reliability Analysis of Engineering Structures (3)

Operational and structural failure mechanisms; instability, fracture, and fatigue. Operational and structural safety, probability of failure. Aspects of probabilistic structural analysis, statistics of extremes, risk and reliability, optimal design criteria. Prerequisite: ApSc 115 or equivalent. (Fall)

254 Special Topics in Structural Engineering (3)

Selected problems in structural mechanics and design: (1) thermal stresses in structural systems, (2) advanced probabilistic structural mechanics, (3) structural design for dynamic loads, (4) structural design for repeated loads, or (5) structural synthesis and optimization. May be repeated for credit. Prerequisite: CE 210 and approval of Department. Topic to be announced in the *Schedule of Classes.* (As arranged)

255 Coastal Processes (3)

Longshore currents and nearshore circulation; coastal sediment properties and analysis, longshore transport processes and rates; sediment budget; response of beaches to wave action and structures; tidal inlets, mechanical bypassing; beach nourishment; wind transport of sandy dune stabilization, sediment tracing. Prerequisite: approval of Department. (Spring)

256 Introduction to Ocean and Coastal Engineering (3)

Application of wave mechanics to the analysis of wave motion in coastal and offshore regions: reflection, diffraction, refraction. Wave spectra: procurement of spectral data by direct measurement or from hind-casting techniques. Beaches and littoral drift, mixing processes, outfalls and intakes in the oceans and estuaries, wave forces on coastal and offshore structures, harbor oscillations, tides in estuaries. Prerequisite: ApSc 115, ME 221; or equivalent. (Fall)

257 Harbor and Coastal Engineering I (3)

Waves and swells, tides and currents, coastal regime, estuaries and deltas, structures for coastal protection, principles of harbor navigation, harbor

planning and harbor design, breakwaters and sea walls, quays, dock internal access structures; maintenance of external and internal acces dredging. Prerequisite: CE 256. (Spring)

258 **Harbor and Coastal Engineering II** (3)
Interaction between structures and waves. Analysis and design of flexible structures: piers, jetties, and protective structures; off-shore drilling pla forms. Design criteria, moorings and cables, harbor operations equip ment. Prerequisite: CE 257; CE 252 or equivalent. (Fall)

259 **Theory of Ship Motions and Sea Loads** (3)
Hydrodynamics of bodies oscillating in calm water. Cylinders in the free surface. Forces and moments on a fixed body in waves. Linear-strip theory for six degrees of freedom motions for ships and ocean structures in regular waves. Nonlinear-roll motions. Dynamic loads on floating vehicles and fixed structures in a seaway. Prerequisite: CE 271 or equiv alent. (Fall)

260 **Random Processes in Ocean and Coastal Engineering** (3)
Basic principles and concepts of spectral analysis, linear system, and the superposition principle; statistical prediction and probability function, Ray leigh distribution and its properties, threshold crossing problems, predic tion of extreme values; related topics dealing with statistical prediction of ocean waves, motions, and wave forces of ocean structures. Prerequisite ApSc 115 or equivalent. (Fall)

261 **Analysis of Plates and Shells** (3)
Bending and stretching of thin elastic plates under loading with various boundary conditions, continuous plates and plates on elastic foundations; theory of folded plate structures. Theory of curved surfaces; general linear bending theory and its simplification to membrane theory; bend ing stresses in shells of revolution, shallow shell theory. Specific appli cations. Prerequisite: graduate status. (Spring)

262 **Design of Plate and Shell Structures** (3)
Design of long-span plate and shell roof structures in reinforced concrete and metal; design of containers for fluids and granular materials; com puter applications in the analysis of such structures. Prerequisite: CE 201, 202, 261; or equivalent. (Fall)

263 **Theory of Structural Stability** (3)
General criteria for stability; buckling of elastic and inelastic columns and frames; torsional and lateral buckling; variational methods. Buckling of plates and shells under static loads; stability of stiffened structures; effect of imperfections and boundary conditions. Prerequisite: graduate status. (Fall)

265 **Special Topics in Geotechnical Engineering** (3)
Selected topics such as rheology of soils, computer applications, excava tion and tunneling, ocean engineering problems, or other special topics. May be repeated for credit. Prerequisite: approval of Department. (As arranged)

271 **Theoretical Marine Hydromechanics** (3)
Introductory course designed to acquaint the student with some physical concepts and mathematical tools of theoretical marine hydromechanics. Derivation of the fundamental equations and boundary conditions of

fluid media; application of potential-flow theory to fluid motion around two- and three-dimensional bodies; perturbation concepts. Introduction to thin-ship and slender-body theories. Derivation of force and movement of bodies in calm and disturbed water. Prerequisite: approval of Department. (As arranged)

272 **Advanced Waste Treatment Process Design** (3)

Pre-design considerations; application of kinetics to treatment processes; reactor types and flow characteristics; theory of continuous culture; general considerations of activated sludge processes for industrial waste treatment; miscellaneous topics. Prerequisite: CE 211 or equivalent. (Spring)

274 **Mechanics of Water Waves** (3)

Irrotational theory for deep- and shallow-water waves, reflexion, refraction, diffraction, attentuation. Water waves of finite amplitude: shallow-water theory, tides, bores, long-waves theory, conoidal and solitary waves. Wave generation by wind, state-of-the-art based on correlation between theory and measurements. Wave-breaking and reflexion. Prerequisite: ME 221 or equivalent and permission of instructor. (Fall)

275 **Special Topics in Ocean Engineering** (3)

Selected topics: (1) marine aspects of viscous-flow theory, (2) interfacial (internal) waves, (3) applied random processes in ocean and coastal engineering, or (4) other selected topics. May be repeated for credit. Prerequisite: approval of Department. (Spring)

276 **Water Resources Planning and Control** (3)

The parameters of water resources planning and control: economics of water resources and related natural resources; economics of water quality control; physical parameters of water resource development; water resources law. Prerequisite: approval of Department. (Spring)

298 **Research** (arr.)

Basic research projects, as arranged. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

MECHANICAL ENGINEERING COURSES

201 **Mechanical Measurement** (3)

Precise measurements of mass and length, mechanical and interferometric methods. Prerequisite: approval of Department. (Fall—evening)

202 **Heat Measurement** (3)

Temperature scales; measurement by resistance thermometry, thermocouples, pyrometry, vapor pressure thermometry; heat transfer quantities and their measurement; calorimeters, flow calorimeters. Prerequisite: approval of Department. (Fall—evening)

203 Pressure Measurement (3)
Experimental techniques for quantitative measurement of pressure; working gages, standards, calibration procedures; methods and apparatus for observations near atmospheric pressure, in the high pressure range and in the vacuum range. Prerequisite: approval of Department. (Spring—evening)

204 Advanced Instrumentation Techniques (3)
Pressure and temperature sensors; shadowgraph, schlieren and interferometer systems; laser holography; laser doppler velocimetry; signal conditioning, use of amplifiers with shielding and grounding techniques; digital techniques; signal multiplexing; use of computers; error analysis and data handling. Lecture and laboratory. Prerequisite: approval of Department. (Fall)

214 Advanced Strength of Materials (3)
Advanced problems of stress and strength analysis of structural and machine elements: bending, torsion and buckling of thin-walled structures. Curved beams, stress-concentrations, thermal stresses, creep instability and stress relaxation, contact problems, composite elements. Prerequisite: CE 120 or equivalent. (Spring)

215 Theory of Vibrations (3)
Damped and undamped natural vibrations, transient response and response to harmonic and periodic excitation, natural vibration of discrete and continuous systems; integral formulation of eigenvalue problems, response by modal analysis, approximate methods, influence of secondary effects and constraints, damped systems. Prerequisite: approval of Department. (Fall)

216 Structural Dynamics (3)
Methods of solving vibration problems: differential equation, Rayleigh-Ritz finite element. Free and forced vibration of structural components: straight, curved, and thin-walled beams; plates and shells; sandwich construction. Vibration of built-up structures. Structural wave motion, wave motion in periodic structures. Prerequisite: ME 215. (As arranged)

218 Design of Floating and Submerged Marine Vehicles (3)
Consideration of interaction between hydrodynamics, propulsion, and configuration aspects of design of floating structures and vehicles; effects of submergence and deep submergence; hydrofoil and vertical jet action; structural considerations. Prerequisite: EngS 228. (Fall)

221 Intermediate Fluid Mechanics (3)
The continuum, kinematics of fluids; stress tensor, strain and rate-of-strain tensor; fundamental equations of the flow of viscous compressible fluids. Laplace's equations; source, sink, and doublet; vortices, Biot-Savart theorem and the flow field of a vortex; spherical and cylindrical harmonics; methods of singularity distributions, complex-variable methods; laminar flow of viscous incompressible fluids; boundary-layer concept. Prerequisite: approval of Department. (Fall)

222 Applied Fluid Dynamics (3)
Subsonic lifting line wing theory, direct and inverse solution of the lifting surface theory; singularity method for wing-body combination; vortex lift theory; effects of camber and twist distribution; transonic airfoils; effect of wing sweep, area ruling concept; supersonic linearized wing theory; similarity rules. Prerequisite: ME 221 or equivalent. (Spring)

223 **Aeroelasticity** (3)

Introduction to aeroelastic phenomena; structural deformations of vehicles under static and dynamic loads; vibrations of vehicle structures; static aeroelastic problems (structural deformation, divergence, control effectiveness, and reversal); flutter theory and calculation of flutter boundaries; aerodynamics of steady and nonsteady two-dimensional wings in subsonic, sonic, and supersonic flow; strip theory applications of two-dimensional aerodynamics to three-dimensional lifting surfaces; piston theory and Newtonian-flow theory. Prerequisite: ME 215, 221; or equivalent. (Fall)

224 **Fundamentals of Combustion Engines** (3)

Classification of combustion engines: air cycles, vapor cycles, external combustion engines, internal combustion engines; rotary engines, reciprocating engines, and turbomachinery; ideal cycle analysis; engine heat losses and friction; practical cycle analysis status of computerized cycle analysis; combustion and knocking; carburetion and fuel injection; mixture distribution; valve mechanism; ignition systems; combustion chamber; piston-engine, rotary-engine, and turbomachinery mechanics and balance. Prerequisite: approval of Department. (Fall)

225 **Turbomachinery I** (3)

Review of thermodynamic principles; fundamentals of fluid flow; hydraulic power systems; steam and gas turbine cycles; turbine, compressor, and pump types; energy interchange in fluid machinery; design and characteristics of turbines, compressors, and pumps; linking of compressor and compressor turbine characteristics; combustion systems; regenerators. Prerequisite: approval of Department. (Fall)

226 **Turbomachinery II** (3)

Aerodynamics of aerofoils, flow in cascades, data for turbine calculations, axial turbine aerodynamic design, performance of compressor cascades, axial compressor aerodynamic design. Heat and mass transfer with chemical reaction, combustion of liquid fuels, combustion in premixed gases, combustion without premixing, gas-turbine combustion chamber design. Prerequisite: ME 225. (Spring)

227 **Viscous Flow** (3)

Exact solutions of Navier-Stokes equations; the small Reynolds number approximations, laminar boundary-layer theory and the techniques for its solution, stability of laminar flows; Reynolds theory of turbulent stresses, applications to internal and external flows, turbulent boundary-layer theory; applications to heat transfer problems; flow separation. Prerequisite: ApSc 213; ME 221 or equivalent. (Fall)

231 **Hydrodynamics** (3)

Flow at large Reynolds number: vorticity dynamics, Kelvin's theorem in inviscid flow, vorticity in motions generated from rest, boundary layers, applications of the momentum theorem. Irrotational flow theory: applications of Bernoulli and momentum theorems to steady flows, flow due to a rigid body, two-dimensional motion and applications of complex variable theory, free surface flows, Froude numbers, criterion of dynamic similarity. Effectively inviscid flow with vorticity: sheet vortex, flow with swirl, vortex system of a wing. Prerequisite: ME 221 or equivalent. (Spring)

235 **Compressible Flow** (3)

Thermodynamics and physical properties of gases, fundamental equations

of a compressible inviscid fluid, small perturbation theory, expansions in Mach number and thickness parameters, second-order shock shapes, role of entropy in supersonic flow, shock wave interactions, hodograph transformation, Kármán-Tsien and other model gases, conical flows, transonic flow theory, method of characteristics, rotational nonisentropic flows. Prerequisite: ApSc 213; ME 221 or equivalent. (Spring)

237 Propulsion I (3)

Basic concepts of propulsion: energy transformations in propulsive flows; gas dynamics of combustion, detonation processes; nonuniform flows, mixing; intakes, additive drag; mechanics of flow induction; drag and thrust generation; multiple-flow thrust generators; thrust recovery and augmentation; the propulsion spectrum. Illustrative examples will include propellers, turbojets, turbofans, ramjets, and rockets. Prerequisite: approval of Department. (Spring)

238 Propulsion II (3)

Advanced propulsion concepts: nonsteady flows with viscosity, heat exchanges, and entropy gradients; discontinuities and interactions in nonsteady flow; gas dynamics of nonsteady combustion; static, dynamic, and cryptosteady pressure exchange; energy equalizers and dividers; nonsteady-flow thrust generators. Topics for discussion will include a variety of new flow induction and propulsion concepts. Prerequisite: ME 237. (Fall)

240 Kinematic Synthesis (3)

Determination of linkage proportions from prescribed input-output conditions for both path and function-generating mechanisms; critical comparison of graphical, analytical, and computer-oriented methods. Techniques are applied to the synthesis of various machines and computers. Prerequisite: approval of Department. (Spring)

241 Engineering Systems Design (3)

Principles of system design; interdisciplinary system simulation for mechanical, electrical, fluid, and thermal sciences; dynamic response of systems; mathematical model and analogy studies; optimization techniques with computer-aided solutions. Prerequisite: approval of Department. (Fall)

243 Advanced Mechanical Engineering Design (3)

Design of mechanical engineering systems, components, and equipment; requires the integration of engineering disciplines at an advanced level. Prerequisite: approval of Department. (Fall)

246 Electromechanical Control Systems (3)

System synthesis, compensation, and stabilization using Bode diagrams, root locus, etc.; linear and nonlinear characterization of mechanical, electromechanical, and electronic control components. Prerequisite: approval of Department. (Fall)

247 Fluidics (3)

Introduction of fluidic components and systems: behavior and modeling of bistable and proportional jet devices, vortex amplifiers and sensors, passive elements, transmission lines; system synthesis, coupling effects. Survey of current applications and research. Prerequisite: approval of Department. (Spring)

*248 **Seminar: Aircraft Design I (3)**

Problem of designing an aircraft to certain specifications. Regulatory restraints and requirements, state-of-the-art limitations, computer-aided design, integration of aircraft components, economic considerations, and iterations to final configuration to obtain specified mission profile. Prerequisite: approval of Department.

*249 **Seminar: Aircraft Design II**

Aircraft design in relation to prescribed mission requirements. Different configuration concepts discussed; detailed design features described. Rapid methods for estimating aircraft weight, size, and power to satisfy mission specifications are presented and discussed in depth as are various design trade-offs and compromises. Primary emphasis on subsonic aircraft to satisfy a steady cruising flight mission. Brief attention given to supersonic cruising aircraft and highly maneuvering military aircraft. Overview of special features and problems of STOL aircraft. Prerequisite: approval of Department. (Spring)

250 **Energy Systems Design (3)**

Consideration of energy and power requirements in design of engineering systems; development of optimization methods with computer-aided solutions; selected multidisciplinary problems. Prerequisite: approval of Department. (Spring)

255–56 **Urban Transportation Technology (3–3)**

Problems of headway and capacity for modern transit systems and their relationships to control systems, braking, station design, and system management. Urban vehicle design, including propulsion systems, suspension, steering and switching. System evaluation techniques for technical performance and economic evaluation of new concepts. Prerequisite: approval of Department. (Academic year)

259 **Solar Heating and Cooling Systems (3)**

Availability of solar energy, climatic data for solar heating and cooling. System description, solar collector, thermal energy storage, auxiliary energy source; system performance requirements. Subsystems evaluations, collector performance analysis, collector fluid loop optimization, thermal energy storage requirements. System configurations and modeling, control system requirements. Estimation of the total life-cycle costs for selected solar heating and cooling systems. Architectural features and considerations. Prerequisite: approval of Department. (Fall)

260 **Heating, Refrigeration, and Air Conditioning (3)**

Fluid flow and heat transfer; heating and cooling load calculations; design of heating and cooling distribution systems; design and characteristics of evaporator, condenser, expander, and compressor. Methods of refrigeration and air conditioning: vapor-compression refrigeration, absorption refrigeration, steam jet refrigeration, thermo-electric refrigeration, low-temperature refrigeration, heat pumps, basic air-standard cycles, regenerative and bootstrap air cycles. Method of heating: warm-air, hot-water, electric-resistance, and solar heating systems and heat pumps. Prerequisite: approval of Department. (Spring)

*Offered at NASA-Langley Research Center; may be offered on campus when arranged.

261 Fundamentals of Environmental Control I (3)

Understanding environmental systems, water as natural resources, air as an ecological limiting factor, man's inadvertent modification of weather and climate, solid wastes, noise, pesticides, and radiation, natural resources utilization of terrestrial ecosystems, international cooperation, citizen participation, environmental needs. Prerequisite: approval of Department (Fall)

262 Fundamentals of Environmental Control II (3)

Directed field investigations; case studies and workshops to document ecological problems associated with power plants, power plant site selection, impoundments, and industrial discharges among others as they relate to the current National Environmental Policy Act of 1970 and the anticipated future national policies. Prerequisite: ME 261 or equivalent. (Spring)

263 Environmental Control Processes I (3)

Control of particulates emissions: settling, filtration, cyclonic collection, wet collection, and electrostatic precipitation. Control of gaseous emissions: absorption, adsorption, incineration, and condensation. Design, operation, and current status of air-pollution control processes. Prerequisite: approval of Department. (Spring)

264 Environmental Control Processes II (3)

Selected problems in the application of mechanical engineering science to the design of environmental control equipment, i.e., theory of vortex flow, design of vortex equipment for separation of solid and oil suspensions from water; mechanics of air bubbles in water, mechanical generation of air bubbles, design of turbine, jet diffuser, and porus diffuser for aeration systems; thermodynamics and kinetics of combustion, application of combustion theory to design of incineration systems for sludge and solid disposal; theory of mass transfer and its application to hyperfiltration systems. Prerequisite: ME 261, 262; or equivalent. (Fall)

265 Air-pollution Meteorology (3)

Weather and motion systems of atmosphere; ground- and upper-level air conditions; atmospheric stability and inversions; atmospheric turbulence and diffusion; urban and topographic effects upon meteorological parameters; effects of meteorological parameters upon transportation and diffusion of pollutants; meteorological factors in plant location, design, and operation, and in urban planning. Prerequisite: ME 221 or equivalent. (Fall)

266 Experimental Methods for Environmental Control (3)

Theory and reference methods for air pollutants analysis, instrumentation for air pollutants monitoring, sampling, and analysis; theory and devices for thermal environmental control systems. Guided laboratory projects and experiments. Prerequisite: ME 260, 261; or equivalent. (Spring)

***270 Aerodynamics of Flight Vehicles (3)**

Aerodynamic loads on flight vehicles, interference effects, application of aerodynamic theory to aircraft design, studies of aircraft dynamics and performance. Prerequisite: ME 222 or equivalent. (Spring)

---

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

*271 **VTOL Aircraft Technology** (3)

Fundamental principles of VTOL aircraft; hovering performance based on momentum theory; analysis of jet-induced interference effects; transition aerodynamics; theoretical stability and control and correlation with flight data; ground-effect theory and experiment; handling qualities criteria; elements of instrument approach and landing problem. Prerequisite: approval of Department. (Spring)

*272 **STOL Aircraft Technology** (3)

Basic principles of propulsive-lift STOL aircraft; high-lift aerodynamics; theoretical low-speed stability and control; handling qualities simulation and flight studies; fundamentals of internally blown and externally blown concepts; analysis of the engine-out problem; aerodynamic ground effect theory and experiment; elements of quiet propulsive lift problem; analysis of static and dynamic loads with blown flaps. Prerequisite: approval of Department. (Fall)

*273 **Principles of Automatic Flight Control** (3)

Design of aeronautical instrumentation and feedback controls; mathematical models of sensors, controllers, and actuators; theory of feedback control, stability, accuracy, and speed of response; equalization effects of nonlinearities and noise. Prerequisite: approval of Department. (Fall)

*274 **Principles of Flight Guidance** (3)

Guidance requirements for atmospheric flight; implementation of guidance systems using inertial and radio techniques in conjunction with automatic data processing. Prerequisite: ME 273. (Fall)

275 **Stability and Control of Vehicles** (3)

Derivation of equations of motion, Euler transformations and direction cosines, stability derivatives and linearization of equations of motion, stability of linear systems with application to longitudinal and lateral dynamics, Laplace transform techniques and frequency response analysis. Prerequisite: approval of Department. (As arranged)

*276 **Mechanics of Space Flight** (3)

First- and second-order Hamilton-Jacobi perturbation theory applied to artificial satellites, von Zeipel's methods, special and general perturbation theories for third-body perturbations. Differential correction of orbits by weighted least squares and minimum variance techniques. Comparison of various filtering techniques as applied to orbit determination and other space flight parameter estimation. Prerequisite: approval of Department. (As arranged)

*277 **Numerical Methods in Fluid Mechanics** (3)

Numerical solution of partial differential equations of fluid flow; finite-difference techniques for viscous and inviscid flows; stability; methods of characteristics; boundary conditions; applications in subsonic and supersonic flows. Prerequisite: ApSc 213, EngS 284; or equivalent.

278 **Performance, Stability, and Control of Helicopters** (3)

Development of rotor blade theories; actuator disc, blade element, vortex theory. Hovering and climb performance, autorotation and forward flight

*Offered at NASA-Langley Research Center; may be offered on campus when arranged.

performance. Rotor system mechanics, flapping motion of articulated and semi-rigid rotors, blade motions in plane of rotation. General performance and design considerations. Stability and control in hovering and forward flight, damping in pitch and roll, static stability with speed and angle of attack. Prerequisite: ME 222, 275. (Spring)

*279 **Special Topics in Flight Sciences** (3)

Current problems and methods in high angle of attack stability and control. Nonlinear aerodynamics in the angle of attack region above the stall. Influence of aircraft design and nonlinear aerodynamics parameters on the poststall stability and control of aircraft. Employment of current experimental techniques and development of equations pertaining to developed spin and recovery characteristics. Prerequisite: ME 275 or approval of Department. (Spring)

280 **Advanced Thermodynamics** (3)

Statistical significance of the entropy concept, conditions of equilibrium, equilibrium of heterogeneous systems. Application of thermodynamic formalism to magnetic, electric, and solid systems; equilibrium of ionized gases; the Nernst postulate and the third law of thermodynamics. Prerequisite: graduate status. (Fall)

281 **Nonequilibrium Thermodynamics** (3)

Limitations of equilibrium thermodynamics, entropy production, phenomenological equations and linear laws; postulates of nonequilibrium thermodynamics, formulation of the equations of nonequilibrium systems, statistical foundations, stationary nonequilibrium states; selected applications. Prerequisite: ME 280. (Spring)

282 **Energy Technology** (3)

Energy, society, and the national economy; energy consumption patterns, future outlook for energy supply and demand, projections; world energy resources; assumptions for resource estimation and the energy demand; conventional fuel resources; nuclear fuels; future resource development; issue of energy production and the environment; prospects for future shortages; systems approaches to energy conservation. Energy conversion, fundamental principles and technological options; new technology and energy sources. Generation of electricity; trends in the electricity industry; projected growth in the use of electric power; outlook for electric power costs; structure of the electric power industry; planning and construction of new facilities; environmental effects of generating electricity—economic implications; regulatory agencies. Prerequisite: approval of Department. (Spring)

283 **Nuclear Reactor Engineering** (3)

Atomic and nuclear structures; neutron, fission, and chain reaction; nuclear reaction and radiation; diffusion and slowing down of neutrons; criticality condition; reactor theory; reflected reactors; homogeneous reactor systems; heterogeneous reactor systems; fast reactors; control and operation of reactors; reactor design calculations; reactor coolants, flow and heat transfer; radiation protection and reactor shielding; mechanical and structural components of power reactors. Prerequisite: approval of Department. (Spring)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

*285 **Reaction Kinetics** (3)

Theoretical aspects of kinetics of homogeneous and heterogenous reactions in gaseous and liquid systems. Prerequisite: ME 280. (Spring)

286 **Special Topics in Mechanical Engineering** (3)

Prerequisite: approval of Department. (As arranged)

287 **Heat Conduction** (3)

Conduction of heat through solid, liquid, and gaseous media; formulation and methods of analytical, numerical, and analog solutions; steady two- and three-dimensional problems, problems in unsteady heat conduction; conduction in composite regions. Prerequisite: ApSc 213 or equivalent. (Fall)

288 **Convective Heat and Mass Transfer** (3)

Heat and momentum transfer in laminar and turbulent flow; application of boundary-layer theory to problems of forced convection; the laminar boundary-layer and similarity solutions; heat convection in turbulent flow, momentum-heat transfer analogy; the influence of temperature-dependent fluid properties; convective heat transfer at high velocities; mass transfer; formulation of a simplified theory; some solutions to the conserved property equation. Prerequisite: ME 221 or equivalent. (Spring)

289 **Radiative Heat Transfer** (3)

Nature of thermal radiation; radiative characteristics of surfaces; thermal radiation within evacuated enclosures; configuration factors algebra; solution methods for the integral equations of radiant interchange; enclosures containing an absorbing and emitting medium; absorbing, emitting, and scattering media; combined radiation, conduction, and convection. Prerequisite: ApSc 214 or equivalent. (Fall)

*290 **Kinetic Theory of Gases** (3)

Equation of state and physical properties for gas composed of discrete particles; relation of kinetic theory to thermodynamics; Maxwell distribution of molecular velocities; Boltzmann H theorem. Molecular interactions, free paths, collision rates, scattering coefficients. Introduction to diffusion, viscosity, heat conduction; imperfect gases; flow of gases at low density. Prerequisite: ME 280. (Spring)

291–92 **Power Systems** (3–3)

Design of thermal power system components and system optimization. Steam cycle power generation system components: steam generators, reactor coolant system, condensate and feedwater system, turbine-generator, waste heat removal. Heat balance studies, options for improved cycle efficiencies, system optimization studies, component selection and design, cooling towers, lakes and ponds. Review of safety and pollution regulations; testing, inspection, and codes. Survey of electric power system technology. Prerequisite: ME 148, 187; or equivalent. (Academic year)

295 **Statistical Thermodynamics** (3)

Distribution functions; Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; partition functions, correspondence between classical and statistical

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

thermodynamics. Systems with negligible effects of interparticle forces; perfect gases, perfect electron gas, photon gas. The Debye solid, the Einstein solid. Prerequisite: ME 280. (Spring)

296 **Special Topics in Heat and Mass Transfer** (3)
Prerequisite: approval of Department. (As arranged)

297 **Special Topics in Fluid Mechanics** (3)
Prerequisite: approval of Department. (As arranged)

298 **Research** (arr.)
Research as arranged. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)
(Fall and spring)

310 **Mechanics of Non-Newtonian Fluids** (3)
Classification of fluids; physical properties of composite fluids; convected coordinate systems; fundamentals of constitutive equations of composite fluids; purely viscous fluids, Reiner and Rivlin theories, power-law fluids, linear theory of viscoelastic fluids, Boltzmann principle, quasi-linear viscoelasticity; nonlinear theory of viscoelasticity, Rivlin-Ericksen theory; viscoplastic fluids, Bingham plastic fluids, Oldroyd's analysis; viscometry and rheogoneometry; turbulent flow of suspensions and emulsions in pipes, frictional drag reduction by polymeric additives. Prerequisite: approval of Department. (Fall)

311 **Nonsteady Flow** (3)
Fundamental equations of nonsteady viscous flow; frames of reference; Eulerian and Lagrangian methods. Boundary conditions; characteristics and waves, isentropic and nonisentropic disturbances; discontinuities, interactions, special transients. Piston theory and the oscillating airfoil. Nonsteady flows with viscosity and entropy gradients. Prerequisite: ME 235 or equivalent. (Fall)

312 **Theory of Turbulence** (3)
Concept of turbulence, theory of transition, stability, isotropic turbulence, free turbulence, turbulence shear flows, transport process in turbulent flow. Prerequisite: ME 227. (Fall)

315 **Hypersonic Flow** (3)
Small-disturbance theory, Newtonian theory; constant-density solution, theory of thin shock layers, flow over blunt bodies, hypersonic viscous flow. Prerequisite: ME 227. (Fall)

317 **Physical Gas Dynamics** (3)
Molecular and atomic phenomena in gases, intermolecular forces, specific heats, equation of state for a real gas, dynamics of dissociating gas, radiation. Prerequisite: ME 235; ME 295 or equivalent. (Spring)

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)
Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

ENGINEERING SCIENCE COURSES

*201 **History of Technology I** (3)

The characteristic technologies of Prehistory, the Ancient Near East, Greece and Rome, Byzantium and Islam, and Christian Europe. Technology is broadly defined. Emphasis is on its manifold interactions with other cultural forces. (Fall)

†202 **Advanced General Metrology** (3)

Topics in the conceptual, physical, and mathematical aspects of measurement, standards, design for precision measurement and measurement at extreme values. Prerequisite: graduate status. (Fall—evening)

†203–4 **Probability and Statistics of Metrology** (3–3)

Probability distributions, discrete and continuous distributions; sampling; combinatorial analysis; stochastic processes; conditional probability; correlation; analysis of variance; design and analysis of experiments; Latin Square experiments; factorial experiments; block and lattice design. Prerequisite: ApSc 115 or equivalent. (Academic year—evening)

*206 **Technology and Human Needs** (3)

Sociology of science and technology, the solar systems and earth, population, nonrenewable resources, renewable resources, energy, nuclear energy, renewable energy conversion, environment, productivity, transportation. Prerequisite: approval of Department. (Fall and spring)

209 **Technical and Environmental Risk Assessment, Control, and Insurance** (3)

Principles of risk assessment and control with respect to high-risk technological systems and environmental effects such as windstorms, earthquakes, and floods. Risk-control and disaster mitigation. Risk assessment and insurance. Prerequisite: ApSc 115 and approval of Department. (Fall)

*211 **History of Technology II** (3)

The development of the technology of the Atlantic community and its increasing influence throughout the world. Technology is broadly defined. Emphasis is on its manifold interactions with other cultural forces. (Spring)

217 **Analytical Mechanics** (3)

Fundamental principles, generalized coordinates, variational principles and Lagrange's equations, nonholonomic systems, Hamilton's equations, theory of small oscillations. Prerequisite: approval of Department. (Spring)

221 **Theory of Elasticity I** (3)

Introduction to Cartesian tensor analysis; deformation, stress, linear constitutive relations, formulation of boundary value problems, variational principles; torsion and bending of prismatical rods, plane problems in elastostatics. Prerequisite: approval of Department. (Fall)

222 **Theory of Elasticity II** (3)

Application of integral transforms and analytic function theory to solution of plane problems in static and dynamic elasticity. Introduction to three-dimensional elastostatics. Prerequisite: EngS 221, ApSc 211. (Spring)

* May be taken for undergraduate credit as an elective in the humanities.
† Offered at NASA-Langley Research Center; may be offered on campus when arranged.

228 **Physical Oceanography** (3)

Seawater, equations of motion, interaction between air and sea, currents, wind-waves in deep and shallow waters, long ocean waves, tides, wave statistics, sea ice. Prerequisite: ME 221 or equivalent. (Spring)

231 **Solid State for Engineers** (3)

Crystal structures, crystal diffraction, reciprocal space, elastic constants, elastic waves, lattice vibrations, thermal properties, electronic structure, energy bands, semiconductors, superconductivity, magnetic properties, optical properties. Prerequisite: approval of Department. (Fall)

232 **Advanced Materials Science** (3)

Elastic properties; imperfections: point defects, dislocations, dislocation networks, grain boundaries; anelasticity, microplasticity and plasticity, creep, work hardening; alloy hardening: solid solutions, precipitates. Prerequisite: approval of Department. (Spring)

233 **Superconductivity and Electron Transport** (3)

Electromagnetic concepts, second quantization-creation and destruction operators, thermodynamic theories. The intermediate state (Type I superconductors), transport phenomena, the mixed state (Type II superconductors). Statistical and quantum superconductivity. Microscopic theory of superconductivity. Persistent currents. Properties of metallic superconductors, thin films; metallurgical aspects, intercalation and sandwiching. Organic superconductivity. Prerequisite: EngS 231. (Spring)

234 **Composite Materials** (3)

Principles of composites and composite reinforcement; micromechanics and failure; interface reactions in various composites; reinforcing materials; structure of composites—fiber-reinforced polymers, filler-reinforced polymers, fiber-reinforced metals, directionally solidified alloys, dispersion-strengthened metals. Prerequisite: approval of Department. (Spring)

235 **Physical Metallurgy** (3)

Relations among structures, properties, and reactions of metals and alloys; equilibria, kinetics of reactions, annealing, recrystallization grain growth, phase transformations, precipitation, solidification, twinning and martensite reactions. Prerequisite: approval of Department. (Spring)

*237 **Quantum Mechanical Treatment of Metals** (3)

Elements of quantum mechanics, including Schroedinger equation and elementary perturbation theory. Applications to basic processes in the theory of solids: lattice waves, electron states, electron-electron and electron-phonon interactions. Boltzmann equation and transport properties. Fermi surfaces; theory of superconductivity. Prerequisite: EngS 231 or approval of Department. (Spring)

*239 **Physical Ceramics** (3)

Crystal chemistry and the systematic study of the structure of ceramic materials; solid reactions occurring at elevated temperatures; sintering, vitrification, diffusional mechanisms and effects; reaction rate theory; elastic, anelastic, and plastic properties of ionic and covalent solids; viscoelastic behavior of vitreous and vitreous-solid systems; phase equilibria of ceramic systems. Prerequisite: approval of Department. (Spring)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

240 **Fracture Mechanics** (3)

Fundamentals of brittle fracture, Griffith theory and extensions, mechanics of fracture, linear elastic systems, plasticity considerations, fracture toughness, engineering analysis, notch strength analysis with limit approach, crack propagation laws, fatigue, fracture testing, comparison of recent continuum theories. Prerequisite: approval of Department. (Spring)

241 **Fatigue and Failure of Materials** (3)

Extreme environments: oxidation, corrosion, high temperature creep; fatigue: cyclic hardening and softening, crack initiation and propagation, statistical analysis of strength. Prerequisite: approval of Department. (Fall)

242 **Materials Recycling and Recovery** (3)

Study of the techniques and technology necessary to recover materials for reuse; emphasis on those materials in critical supply and on situations where continued use of virgin material will cause degradation of the environment. Consideration of economic factors affecting recovered resource price such as energy consumption, transportation, tax advantages, or disadvantages, suitability of resultant products, and market demand. (As arranged)

251–52 **Transportation** (3–3)

A "workshop" for the study of the problems of urban and interurban transportation; identification of the problems of mass transportation and assessment of alternative solutions. Topics for discussion include the nontechnological requirements and constraints of mass transportation and the technological problems of power supply, propulsion, support and suspension, guidance and control, guideways and stations. Prerequisite: approval of Department. (Academic year)

253 **Control of Automated Transit Networks** (3)

Automatic traffic control techniques for automated transportation systems including rail rapid transit, group rapid transit, and personal rapid transit systems; extension of road traffic characterizations to automated systems; operating policies for automatically controlled vehicles; implementation of vehicle control systems for various headways; merging traffic control vehicle dispatching and routing strategies for automated transit networks; examples of current system technologies. Prerequisite: approval of Department. (Spring)

256 **Introduction to the Theories of Inelastic Media** (3)

Physical basis of anelasticity, viscoelasticity, plasticity, and viscoplasticity; constitutive equations of elastic and viscoelastic media; foundations of the theories of plasticity and viscoplasticity; boundary-value problems and wave propagation in inelastic media. Prerequisite: ApSc 213 or equivalent and approval of Department. (Spring)

*263 **Atmospheric Physics for Engineers I** (3)

Atmospheric radiation: phenomenological equation of transfer; solutions to the transfer equation; optical, physical, and chemical properties of atmospheric constituents; remote sensing and the direct inversion problem; energy transfer and atmospheric structure. Prerequisite: approval of Department. (As arranged)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

***264 Atmospheric Physics for Engineers II (3)**

Atmospheric dynamics: mean structure of the atmosphere, temperature pressure, and wind fields; mass, momentum, and energy transfer; large-scale features of atmospheric circulation; regional features of atmospheric circulation; micrometerology. Prerequisite: approval of Department. (As arranged)

270 Introduction to Acoustics (3)

Waves in an infinite homogeneous medium; sound transmission in layer media and through structure, source, and dipole fields; sound propagation in ducts and enclosures; sound propagation through atmosphere and acoustic absorptions, acoustic circuit elements; acoustic transducers; introduction to acoustic measurements. Prerequisite: approval of Department. (As arranged)

***271 Random Process Theory I (3)**

Random processes; stationarity and ergodicity; mean-square calculus; auto- and cross-correlations and spectra; random processes in linear systems; mean-square estimation, prediction and filtering; zero and level crossings and peak distributions; applications in aerospace sciences. Prerequisite: EngS 203 or approval of Department.

***272 Random Process Theory II (3)**

Discrete and continuous state Markov-processes; chains, queues, diffusion, and passage problems; linear and nonlinear estimation and stochastic control; estimation of correlations and power spectra; applications in communication theory; scattering from random surfaces; stochastic linearization and stability. Prerequisite: EngS 271. (As arranged)

***273 Time Series Analysis (3)**

Harmonic analysis of deterministic and random signals; auto- and cross-correlations and spectra; periodogram, Blackman-Tukey and direct filtering methods of spectral estimation; effects of finite length and digitization; variability; coherence. Fast Fourier transform techniques; applications to moder technology. Prerequisite: EngS 271 or approval of Department.

274 Noise and Vibration Control (3)

Introduction to the physical effects of noise and vibration on man, practical sources of noise and their control; building noise, ventilation system noise, mechanical equipment noise, aircraft noise; automobile and truck noise; factors affecting vibration levels and vibration control by structural design, damping, and isolation. Prerequisite: EngS 270, ME 215. (As arranged)

***275 Advanced Theoretical Acoustics (3)**

Acoustic wave motion, several methods of solving inhomogeneous wave equation, theory of sources, scattering and diffraction, duct propagation, introduction to acoustically coupled systems, acoustics in moving media. Prerequisite: ApSc 213, EngS 270. (As arranged)

***276 Acoustical and Mechanical Measurements (3)**

Characteristics of signals, basic transducer elements, standards of measurements and calibrations, signal recording and processing, acoustical and

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

vibration instrumentation, vibration exciters, vibration testing techniques, flow mechanical measurements. Prerequisite: EngS 270, ME 215. (As arranged)

*277 **Physical Acoustics** (3)

Concepts of continuum mechanics and thermodynamics, wave propagation in real media, thermal viscous and relaxational attenuations, piezoelectric crystals and ultrasonics, wave propagation in rigid and deformable porous media. Prerequisite: EngS 275. (As arranged)

*278 **Psychological and Physiological Acoustics** (3)

Auditory system and its response to sound, experimental methodology in psychoacoustics, subjective response to sound, environmental noise and its evaluation, criteria for the prediction of noise nuisance, nonauditory system response to noise. Prerequisite: approval of Department. (As arranged)

*279 **Human Factors in Engineering** (3)

Man-machine interface, effects of physical stresses on human behavior and performance, life support system, learning and conditioning of physical stresses. (Spring)

*280 **Special Topics in Acoustics** (3)

Current methods and problems in acoustics. Topics chosen from such areas as aerospace noise generation and control; instruments and procedures for acoustics measurements; and responses of structures, people, and communities to noise. Prerequisite: approval of Department. (As arranged)

281 **Advanced Programming Techniques for Engineering Mechanics Problems** (3)

Comparative presentation of data and control structures available in a number of scientific programming languages. Efficient algorithms for manipulation of structural data. Organization and management of data bases for large engineering systems. Techniques for efficient construction of large computer programs for engineering systems with emphasis on fundamental structured programming principles. Investigation of effects of CPU organization and other hardware features of computer systems on numerical computations involved in engineering systems. Prerequisite: approval of Department. (Spring)

282 **Computer-aided Design** (3)

Fundamental concepts in the development of computational algorithms for the design of structures, machine component and assemblies, and other engineering systems. Representation of the design process and design specifications as a network of decision tables and logical flags. Optimization techniques and algorithms in design applications. Interactive computer-aided design methods based on the use of remote access computer terminals. General purpose computer programs for engineering analysis and design. Students, individually or in groups, are required to develop a small-scale general-purpose design program in an appropriate area such as structural design, machine design, urban planning, environmental quality control, etc. Prerequisite: EE 51 or equivalent, CE 210 or equivalent, and approval of Department. (Fall)

*Offered at NASA-Langley Research Center; may be offered on campus when arranged.

283 **Application of Computer Graphics in Engineering** (3)

Curve-fitting techniques as applied to computer graphics; construction of a library of geometric lines and curves connecting a series of discrete points. Representation of two- and three-dimensional geometrical shapes by a set of discrete points. Automatic generation and display on CRT screen of geometrical shapes consisting of a grid of discrete points interconnected by user-selected geometric shapes. Automatic mesh generation, transformations, projections, and the concept of "hidden" lines. Use of remote computer terminals and graphic plotter equipment in interactive computer-graphics applications. Prerequisite: EE 51 or equivalent, ES 284 or equivalent. (Spring)

284 **Numerical Methods in Engineering** (3)

Review of programming fundamentals; matrix operations and solution of simultaneous equations; difference methods and computer solution of ordinary and elliptic partial differential equations; numerical solution of initial and boundary-value problems in heat transfer, fluid flow, and structural mechanics. Prerequisite: approval of Department. (Fall)

285 **Finite Element Methods in Engineering Mechanics** (3)

Formulation of the finite element method through variational principles for structural and continuum mechanics problems. Plane stress, plane strain, three-dimensional elasticity, plate bending, thermal conduction, and potential flow. Techniques of constructing and assembling characteristic elemental matrices, computer implementation of the finite element method. Prerequisite: approval of Department. (Spring)

*286 **Analysis and Design of Thin-walled Structures** (3)

Statics of thin-walled beams and panels, force interplay between stiffeners and skin in the analysis and design of stiffened thin-walled structures; strength and stiffness of locally buckled stiffened structures; classification of loads and safety factors; different considerations governing the design of thin-walled structures; critical evaluation of various structural design procedures. Prerequisite: approval of Department. (As arranged)

*287 **Automated Design of Complex Structures** (3)

Review of techniques for automated design including mathematical programming, fully stressed design, and optimality criteria; application of automated design techniques to stiffened and composite shell-type structures; multiple-load conditions and design constraints. Prerequisite: approval of Department. (As arranged)

288 **Advanced Finite Element Methods in Structural Mechanics** (3)

Formulation of various finite element models in solid mechanics. Examination of errors, convergence characteristics. Application to nonlinear and dynamic problems including large deflection, stability, and inelastic problems. Recent developments of finite element methods. Prerequisite: Engs 285. (As arranged)

289 **Special Topics in Theoretical and Applied Mechanics** (3)

Selected topics in theoretical and applied mechanics: (1) nonlinear mechanics, (2) nonlinear mechanics of continua, (3) wave propagation in solids, or (4) other appropriate topics. May be repeated for credit. Prerequisite: approval of Department. (As arranged)

---

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

298 **Research** (arr.)

Basic research projects as arranged. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

*310 **Aeroacoustics** (3)

General theory of aerodynamic sound generation and propagation, Lighthill's formulation of jet noise, similarity laws, supersonic and subsonic jet noise, boundary layer noise, fan and compressor noise, helicopter noise, sonic booms. Current problems in aeroacoustics. Prerequisite: EngS 275. (As arranged)

*311 **Nonlinear Acoustics** (3)

Finite amplitude waves and waves in moving stratified media. Interaction between linear and nonlinear waves, wave propagation through nonlinear media, applications to transmission of sound through ducts with flow and absorbing walls. Prerequisite: approval of Department. (As arranged)

*312 **Theory of Random Vibration** (3)

Response of linear systems to stationary random inputs. Failures resulting from dynamic response. Response of space vehicle structures to intense noise fields, measurement, and application. Prerequisite: EngS 271, ME 215. (As arranged)

*313 **Structural Acoustic Interaction** (3)

Coupled response of structures to sound, system of infinite extent, system of finite extent, sound radiation from structure, sound transmission through structure. Panel response to turbulent boundary-layer excitation. Sound radiation from mechanically excited structure vibration. Prerequisite: EngS 270, 312. (As arranged)

314 **Advanced Numerical Methods in Engineering** (3)

Advanced methods for numerical solution to engineering problems: finite difference solutions to elliptic, parabolic, and hyperbolic equations, method of characteristics, stability of initial value methods, numerical solutions to integral equations, optimization and mathematical programming methods, selected topics for fourth-generation computers. Prerequisite: EngS 284, ApSc 213. (Spring)

398 **Advanced Reading and Research** (arr.)

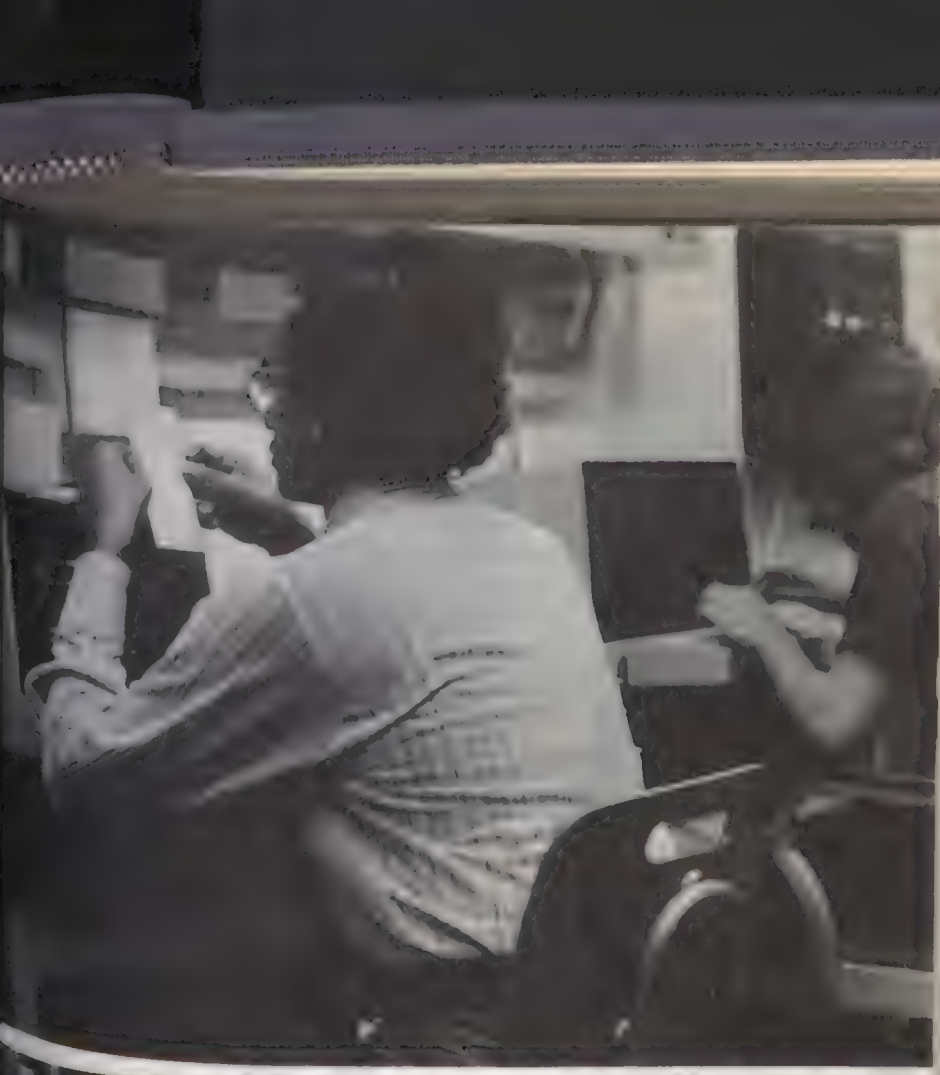
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

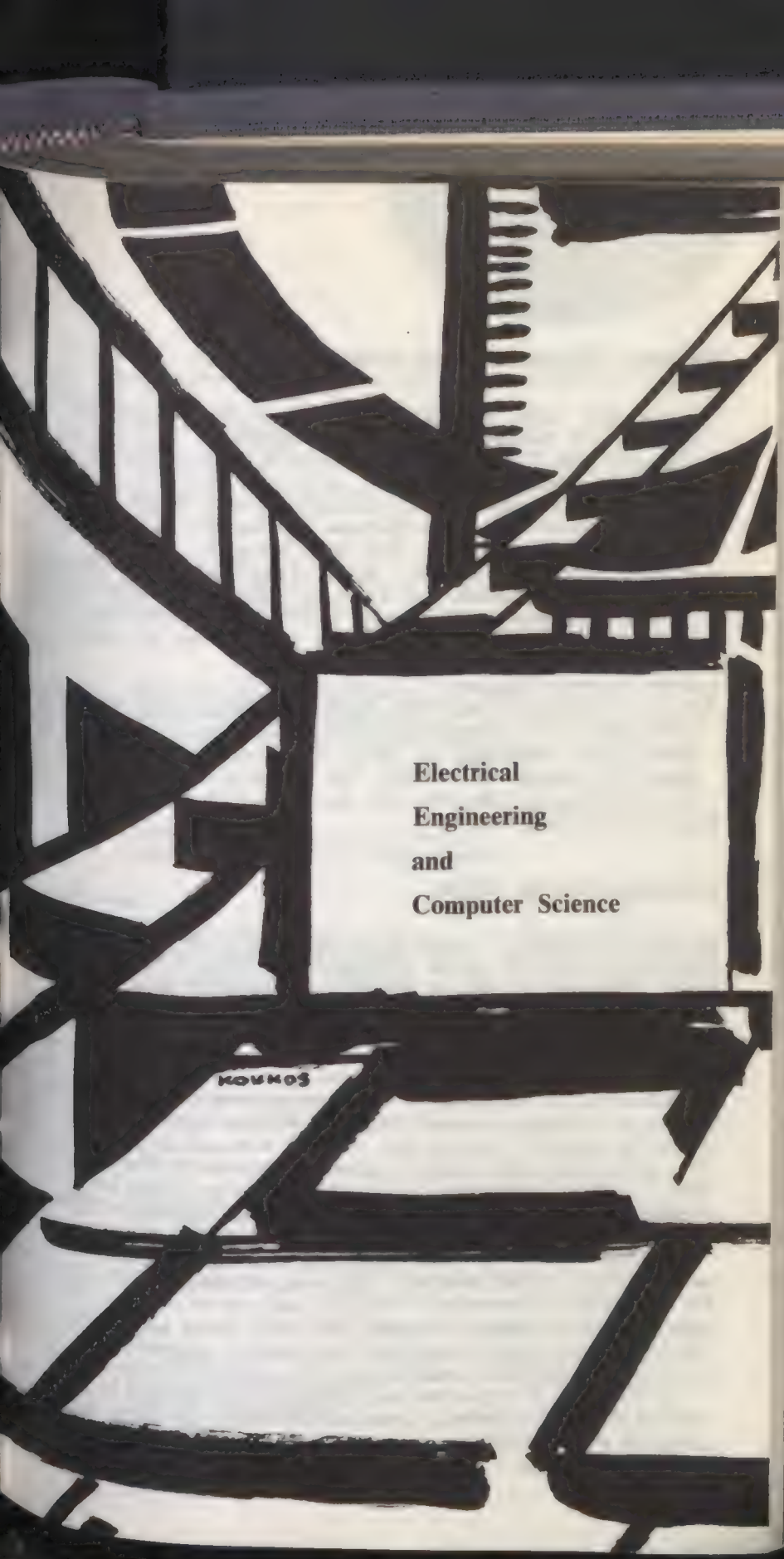
* Offered at NASA-Langley Research Center; may be offered on campus when arranged.











Electrical
Engineering
and
Computer Science

Electrical Engineering and Computer Science

Professors R.B. Heller, W.K. Kahn, Raymond Pickholtz, Harry Van Trees *(Visiting)*, A.C. Meltzer *(Chairman)*, M.F. Eisenberg
Adjunct Professors F.K. Harris, Charles Feldman, Ernst Weber, John Pasta, Elmer Lipsey, George Rappaport
Professorial Lecturers S.J. Raff, J.F. Halldane, Guenther Hintze
Associate Professors E.H. Braun, Nicholas Kyriakopoulos, R.H. Lang, W.D. Maurer, Abd-el-fattah Abd-alla, N.A. Sloan *(Research)*
Associate Professorial Lecturers C.L. Fricke, Wasyl Wasylkiwskyj, B.M. Horowitz, Leonard Schuchman, A.R. Shulman, W.H. Carter, Allen Das, R.H. Thompson, P.J. Martin, J.W. Schwartz, R.L. Stermer, Jr., D.S. Arnstein, Lynn Hopewell, Jr., J.W. Benoit, C.S. Maiorana, R.E. Merwin, R.D. Shults, L.A Rubin, Allan Schneider
Assistant Professor **Ting Lee**
Assistant Professorial Lecturers D.C. Rohlfs, J.L. Wolfgang, Jr., W.J. English, G.W. Haigler, W.T. Bisignani, Ram Khatri, J.J. Salasin, R.E. Schneider, J.W. Woods, W.A. MacDonald, J.J. Bisaga, F.D. Moore, E.S. Armstrong, J.E Hogge, J.M. Russell III, C.T. Swift, J.H. Tucker, C.E. Dunham, Irving Haber, P.J. Nahin, R.C. Reynolds, P.D. Bergstrom, R.M. Zeskind
Special Lecturer **Peter Bock**

UNDERGRADUATE STUDY

Electrical engineering is a branch of engineering in which practical as well as theoretical and scientific aspects are integrated to provide a well-balanced discipline. Basic sciences such as physics and mathematics form the roots on which electrical engineering builds to create a truly applied science and to develop the techniques necessary to solve problems. Analysis, synthesis, and design go hand in hand. The electrical engineering curriculum is designed to provide the student with such an integrated approach. The first two years of the curriculum are common to all undergraduate fields in the School and are devoted to developing a sound foundation of basic sciences coupled with engineering sciences. The third year continues with engineering sciences and starts going deeper into electrical engineering. The fourth year is totally devoted to electrical engineering. At the fourth year the student has a choice of either following the regular electrical engineering curriculum or branching off into an area of concentration in computer science.

The Department of Electrical Engineering and Computer Science has recently acquired modern laboratory equipment, including its own computer. The student has an opportunity during his last year to work on individual projects where his ingenuity, coupled with faculty advice and guidance, permits him to concentrate in areas such as computers, communications, microwaves, controls, electronics, medical engineering, circuits, and others.

The scheduling of courses has been arranged to accommodate both the full-time and the part-time student. Undergraduate courses are offered once a year during the day for full-time students, and once every two years in the evening for part-time students.

SUBJECT AREAS

Networks

EE 11: Linear Networks I
EE 12: Linear Networks II
EE 113: Network Analysis and Design
EE 116: Introduction to Network Synthesis

Fields and Waves

EE 31: Fields and Waves I
EE 32: Fields and Waves II
EE 133: Electromagnetic Waves

Electronics

EE 20: Introductory Engineering Electronics
EE 121: Engineering Electronics and Design
EE 122: Pulse and Waveshaping Electronic Design
EE 124: Electronic Devices

Communications

EE 143: Elements of Communication Engineering I
EE 144: Elements of Communication Engineering II

Computer Science

EE 51: Applications of Computers
EE 52: Computers and Societal Problems
EE 152: Introduction to Digital Computers
EE 153: Design of Switching Systems
EE 154: Digital Computer Design
EE 155: Introduction to Numerical Methods for Computers
EE 156: Introduction to Systems Programming
EE 157: Machine and Assembly Language Programming
EE 158: Algorithmic Methods and High-level Languages
EE 159: Programming and Data Structures

Laboratories and Measurement

EE 60: Introductory Electrical Engineering Laboratory I
EE 61: Introductory Electrical Engineering Laboratory II
EE 160: Electrical Measurements and Instrumentation
EE 161–62: Electrical Engineering Laboratory
EE 165: Senior Design Project

Controls and Systems

EE 172: Control Systems
EE 177: Electrical Energy Conversion
EE 178: Electrical Power Systems

Medical Engineering

EE 184: Introduction to Medical Engineering

CORE CURRICULUM

Normally the first four semesters are common to all undergraduate fields in the School of Engineering and Applied Science.

First Semester

EE 51:	Applications of Computers (3)
Math 30:	Precalculus (3)
Math 31:	Calculus of One Variable (3)
Phys 3:	Foundations of Physics (3)
Elective:	Selected from humanities or social sciences (3)

Second Semester

EE 52:	Computers and Societal Problems (3)
Engl 9 or 10:	English Composition: Language as Communication (3)
Math 32:	Calculus of Several Variables (3)
Phys 14:	Introductory Mechanics and Thermal Physics (3)
Elective:	Selected from humanities or social sciences (3)

Third Semester

ApSc 57:	Analytical Mechanics I (2)
ApSc 113:	Engineering Analysis I (3)
ApSc 115:	Engineering Analysis III (3)
Chem 13:	General Chemistry (4)
Phys 15:	Elements of Electricity and Magnetism (3)
Elective:	Selected from humanities or social sciences (3)

Fourth Semester

ApSc 58:	Analytical Mechanics II (3)
ApSc 114:	Engineering Analysis II (3)
EE 11:	Linear Networks I (3)
CE 140:	Materials Science (3)
Phys 16:	Introduction to Modern Physics (3)
Elective:	Selected from humanities or social sciences (3)

ELECTRICAL ENGINEERING CURRICULUM

Fifth Semester

EE 12:	Linear Networks II (3)
EE 20:	Introductory Engineering Electronics (3)
EE 31:	Fields and Waves I (3)
EE 60:	Introductory Electrical Engineering Laboratory I (2)
EE 157:	Machine and Assembly Language Programming (3)
Elective:	Selected from humanities or social sciences (3)

Sixth Semester

EE 32:	Fields and Waves II (3)
EE 61:	Introductory Electrical Engineering Laboratory II (2)

EE 121: Engineering Electronics and Design (3)
EE 152: Introduction to Digital Computers (3)
EE 177: Electrical Energy Conversion (3)
Elective: Selected from humanities or social sciences (3)

Seventh Semester

EE 122: Pulse and Waveshaping Electronic Design (3)
EE 143: Elements of Communication Engineering I (3)
EE 161: Electrical Engineering Laboratory (2)
Elective: Technical electives (9) (three courses selected from EE 113, 133, 153, 160; ME 131, 187)

Eighth Semester

EE 144: Elements of Communication Engineering II (3)
EE 162: Electrical Engineering Laboratory (2)
EE 172: Control Systems (3)
Elective: Technical electives (5) (two courses selected from EE 116, 124, 155, 165, 178, 184; ME 194)

Technical Electives

EE 113: Network Analysis and Design (3)
EE 116: Introduction to Network Synthesis (3)
EE 124: Electronic Devices (3)
EE 133: Electromagnetic Waves (3)
EE 153: Design of Switching Systems (3)
EE 155: Introduction to Numerical Methods for Computers (3)
EE 160: Electrical Measurements and Instrumentation (3)
EE 165: Senior Design Project (2)
EE 178: Electrical Power Systems (2)
EE 184: Introduction to Medical Engineering (3)
ME 131: Thermodynamics (3)
ME 187: Heat Transfer Theory (3)
ME 194: Energy Conversion (3)

Computer Science Option

Computer science is a new and developing discipline which combines the electronic design and mathematical utilization of computers into a single comprehensive area. The student who completes this option will be able to design both the hardware and software needed for large-scale computing systems. The curriculum prepares the student for graduate school or for a career in computer design and applications.

CURRICULUM

Prerequisite: first four semesters as described in the Core Curriculum, see page 106.

Fifth Semester

EE 12: Linear Networks II (3)

EE 20:	Introductory Engineering Electronics (3)
EE 31:	Fields and Waves I (3)
EE 60:	Introductory Electrical Engineering Laboratory I (2)
EE 157:	Machine and Assembly Language Programming (3)
Elective:	Selected from humanities or social sciences (3)

Sixth Semester

EE 32:	Fields and Waves II (3)
EE 61:	Introductory Electrical Engineering Laboratory II (2)
EE 121:	Engineering Electronics and Design (3)
EE 152:	Introduction to Digital Computers (3)
EE 177:	Electrical Energy Conversion (3)
Elective:	Selected from humanities or social sciences (3)

Seventh Semester

EE 122:	Pulse and Waveshaping Electronic Design (3)
EE 153:	Design of Switching Systems (3)
EE 158:	Algorithmic Methods and High-level Languages (3)
EE 159:	Programming and Data Structures (3)
EE 161:	Electrical Engineering Laboratory (2)
Elective:	Technical elective (3) (one course selected from EE 113, 133, 143)

Eighth Semester

EE 154:	Digital Computer Design (3)
EE 156:	Introduction to Systems Programming (3)
EE 162:	Electrical Engineering Laboratory (2)
EE 172:	Control Systems (3)
Elective:	Technical elective (3) (one course selected from EE 124, 144, 155, 184)

Technical Electives

EE 113:	Network Analysis and Design (3)
EE 124:	Electronic Devices (3)
EE 133:	Electromagnetic Waves (3)
EE 143:	Elements of Communication Engineering I (3)
EE 144:	Elements of Communication Engineering II (3)
EE 155:	Introduction to Numerical Methods for Computers (3)
EE 184:	Introduction to Medical Engineering (3)

ELECTRICAL ENGINEERING COURSES

11 Linear Networks I (3)

Signals and waveforms, average value and RMS, network concepts, elements, and parameters. Kirchhoff's laws, simple networks, energy and power, differential equations of networks and their solution, phasors and steady-state analysis, measurements, impedance concepts, resonance, and filtering. Prerequisite or concurrent registration: ApSc 114. (Spring, day and evening)

12 Linear Networks II (3)

Singular functions; Laplace transform; network functions, poles and zeros

total response; time and frequency domains; convolution theorems; Fourier analysis, spectra; frequency response, Bode plots; two-port parameters. Prerequisite: ApSc 114, EE 11. (Offered every fall—day; fall 1975 and alternate falls—evening)

20 **Introductory Engineering Electronics** (3)

Various types of devices used in electronic engineering considered from the point of view of the physics of their operation and from the engineering point of view of their application to electronic circuits. Solid-state, vacuum, and gaseous devices. Primary emphasis on application of these elements in power supplies and in linear amplifiers. Introduction of design concepts through use of graphical techniques. Prerequisite: EE 11. (Fall—day and evening)

31 **Fields and Waves I** (3)

Vector calculus, orthogonal coordinates, Coulomb's and Gauss' laws, scalar potential, dipoles, method of images, Laplace's and Poisson's equations, boundary-value problems. Prerequisite: Phys 16, ApSc 114. (Offered every fall—day; fall 1976 and alternate falls—evening)

32 **Fields and Waves II** (3)

Biot-Savart law, Ampere's law, vector potential, magnets, polarization and polarization currents, Faraday's law, Maxwell's equations, plane waves, and Poynting vector. Prerequisite: EE 31. (Offered every spring—day; spring 1977 and alternate springs—evening)

51 **Applications of Computers** (3) (Same as CSci 51)

Introduction to the solution of problems on a digital computer using the FORTRAN and BASIC languages; data processing concepts and numerical methods using batch and interactive time-shared terminal computer systems; writing, debugging, and running programs on various digital computer systems. (Fall—day and evening; spring—evening)

52 **Computers and Societal Problems** (3) (Same as CSci 52)

Use of the digital computer in the analysis and modeling of social and urban systems. Applications of analytical methods to the solution of environmental and economic problems. Computer methods used in the simulation of physical, ecological, social, urban, and economic systems. Students formulate problems and simulate systems on a digital computer in order to obtain solutions. Prerequisite: CSci or EE 51 and two years of college preparatory mathematics. (Spring)

60 **Introductory Electrical Engineering Laboratory I** (2)

Use, theory of design, and application of standard electronic laboratory equipment; applications of instrumentation through experiments in basic network theorems; measurement of electrical quantities and characteristics of electrical devices. Prerequisite or concurrent registration: EE 12, 20, 31. (Fall—day and evening)

61 **Introductory Electrical Engineering Laboratory II** (2)

Characteristics of electronic devices and circuits; design of electronic amplifiers and measurement of their properties; experiments in support of courses in networks, fields, and electronics. Prerequisite or concurrent registration: EE 12, 32, 60, 121. (Spring—day and evening)

113 **Network Analysis and Design** (3)

Applications of matrix theory and linear graphs to electrical network

analysis; network equations; signal-flow graphs; introduction to state-space techniques; solution of state-space equations on a digital computer. Network transfer functions, properties of active networks including reciprocity, stability, activity, and feedback. Use of network analysis programs such as ECAP. Prerequisite: EE 12, 20. (Offered every fall—day; fall 19[illegible] and alternate falls—evenings)

116 **Introduction to Network Synthesis** (3)

Network functions and their properties. Positive-real functions and testing for this property. Introduction to two-element, one-port network synthesis. RLC one-port synthesis; the approximation problem in the frequency domain; modern filter theory and design; two-port ladder and lattice synthesis. Introduction to digital filters; truncation errors; realization techniques. Prerequisite: EE 113. (Offered every spring—day; spring 1977 and alternate springs—evening)

121 **Engineering Electronics and Design** (3)

Graphical analysis and design beyond the level covered in EE 20. Introduction of incremental analysis and design methods to electronic circuits; use of equivalent circuits; amplifiers, oscillators, modulation and demodulation. Prerequisite: EE 20. (Offered every spring—day; spring 1976 and alternate springs—evening)

122 **Pulse and Waveshaping Electronic Design** (3)

Introduction to and design of nonlinear circuits used in modern-day computer and communications systems. Pulse, sweep, switching, and logic circuits; counting and timing circuits. Prerequisite: EE 121. (Offered every fall—day; fall 1976 and alternate falls—evening)

124 **Electronic Devices** (3)

Principles of operation of electronic devices used in electrical networks, communication systems, and electronic circuits. Properties of electronic devices and their applications. Modeling of devices such as diodes, transistors, and lasers. Fabrication methods of discrete components and integrated circuits. Prerequisite: EE 12, 20, 32; Phys 16. (Spring 19[illegible]

133 **Electromagnetic Waves** (3)

Time-harmonic Maxwell equations, complex Poynting vector, transmission lines, characteristics of common waveguides, resonant cavities, Smith charts, Lorentz reciprocity, simple antennas, linear antenna arrays. Prerequisite: EE 32. (Offered every fall—day; fall 1976 and alternate falls—evening)

143 **Elements of Communication Engineering I** (3)

Fourier series and transforms; power spectra and correlation; principles of modulation; amplitude, angle, and pulse modulation; modulation and demodulation systems; time and frequency division multiplexing. Prerequisite or concurrent registration: EE 12, 121. (Offered every fall—day; fall 1975 and alternate falls—evening)

144 **Elements of Communication Engineering II** (3)

Introduction to the statistical theory of communication, random signals and noise, concepts of information theory, transmission of information over noisy channels, comparison of modulation systems in the presence of noise. Prerequisite: EE 143. (Offered every spring—day; spring 19[illegible] and alternate springs—evening)

152 **Introduction to Digital Computers** (3) (Same as CSci 152)

Introduction to the use and structure of minicomputers and larger computers. Boolean algebra and the design of combinational switching circuits. Number systems, codes, and arithmetic operations in digital computers. Digital computer subsystems and their interconnections. Interfacing equipment to a minicomputer; timing, control, and electronic requirements. Introduction to programming analog computers; analog computer components; analog-to-digital conversion. Prerequisite: CSci or EE 157. (Offered every spring—day; spring 1976 and alternate springs—evening)

153 **Design of Switching Systems** (3) (Same as CSci 153)

Switching algebra and Boolean logic; sets, relations, and lattices. Analysis and design of switching devices; design of combinational logic networks. Minimization techniques and decomposition methods. Electronic implementation of logic; contact networks, symmetric functions, and threshold logic. Reliable design and fault-detection tests. Number systems and codes, geometric interpretation, error detecting and correcting codes; encoders and decoders. Logic and electronic design of functional digital units. Sequential circuits and iterative networks. Minimization and transformation of sequential machines; structure of sequential machines; partitions and covers. State identification and fault-detection experiments. Prerequisite: CSci or EE 152 or permission of instructor. May be taken for graduate credit. (Fall—day and evening)

154 **Digital Computer Design** (3) (Same as CSci 154)

Logic and electronic design of functional digital units. Design of digital computer subsystems, flow of information and logical flow diagrams in timing and control signals. Design of binary and decimal, serial and parallel digital arithmetic units. Design of memory subsystems, channels, I/0, and storage subsystems. Design of the control unit of a digital computer. Introduction to microprogramming. Design of a small digital computer. Prerequisite: CSci or EE 153 or permission of instructor. May be taken for graduate credit. (Spring—day and evening)

155 **Introduction to Numerical Methods for Computers** (3) (Same as CSci 155)

Use of numerical methods in engineering and scientific problems. Concepts of algorithm and flowchart, errors in computer and numerical methods. Introduction to numerical methods for the solution of simultaneous linear algebraic equations, roots of equations, determination of eigenvalues and eigenvectors, numerical differentiation and integration, interpolation and solution of ordinary and partial differential equations. Statistical methods for the evaluation of experimental data and correlation techniques, curve fitting. Prerequisite: ApSc 114, CSci or EE 51; or equivalent. (Offered every spring—day; spring 1977 and alternate springs—evening)

156 **Introduction to Systems Programming** (3) (Same as CSci 156)

Introduction to computer software systems; concepts in the use of macro-assemblers, loaders, monitors; dispatchers, initiators, and executive systems. Control of input-output in a multiprogrammed batch environment. Control of the job, task, job stream, and secondary storage subsystem. Introduction to simulation and simulation languages. Prerequisite or concurrent registration: CSci or EE 159. (Offered every spring—day; spring 1977 and alternate springs—evening)

157 **Machine and Assembly Language Programming** (3)(Same as CSci 15

Machine and assembly language programming for minicomputers an multiprogrammed large computers. Techniques in on-line terminal pro gramming. Methods of addressing and machine control for fixed and var able word length computers. Input-output control and programming fo minicomputers. Use of a macro-assembler, subroutine linkages, co-rou tines, reentrant and recursive routines. Methods of editing and debuggin Characteristics of minicomputer structure. Prerequisite: CSci or EE 51 o equivalent. May be taken for graduate credit. (Fall—day and evening

158 **Algorithmic Methods and High-level Languages** (3)(Same as CSci 158

Introduction to high-level procedural and problem-oriented language Comparison of computer languages and their structure. Introduction to compiler structure and parsing of compiler statements. Reentrant program ming and reentrant compilers. Correctness of programs. Syntax of high level languages and their recognizers. Introduction to deterministic an probabilistic simulation and simulation languages. Introduction to heuristi programming. Prerequisite or concurrent registration: CSci or EE 15 159; or permission of instructor. May be taken for graduate credit. (Fall—day and evening)

159 **Programming and Data Structures** (3) (Same as CSci 159)

Introduction to discrete structures and data structures in computing. Us of tree structures, arrays, lists, pushdown stacks, files, strings, and linke data structures. Sorting, searching, hashing, and merging of data files. Us of a macro-assembler to structure data. Data management and data sto age. Use of buffers and buffer management. Input-output of data file List and string processing languages and recursive programs. Access meth ods and operating system procedures for use with data structures an macro-assemblers. Prerequisite: CSci or EE 157 or equivalent, or permis sion of instructor. (Fall—day and evening)

160 **Electrical Measurements and Instrumentation** (3)

Electrical measurement from direct current through high radio frequencie Measurements of current, voltage, power, resistance, capacitance, induc ance, energy, phase angle, frequency, and time. Measurements of high frequency signals including field strength, signal-to-noise ratio, impedance and attenuation. Analog-to-digital conversion techniques and digital instru mentation for the control of measurement and instrumentation systems. Transducer characteristics and analog signal processing instrumentation. Laboratory demonstrations of measurements and instrumentation tech niques. Prerequisite: EE 12, 32, 121, 152. (Fall—evening)

161–62 **Electrical Engineering Laboratory** (2–2)

Experiments in support of courses in networks, electronics, microwaves computers, communications, controls, and machines. The student is re quired to begin a design project in the first half of the course; the comple tion of this project is the major effort of the second half. Prerequisite concurrent registration: EE 61, 113, 122; CSci or EE 152. EE 161 is pre requisite to EE 162. (Academic year—day and evening)

165 **Senior Design Project** (2)

The student will conceive, design, construct, and test an original proje in hardware or software. He will write a complete report including

schematic diagrams and repair procedures, if applicable. This project cannot be used to satisfy the project required in EE 161–62 *Electrical Engineering Laboratory*. Prerequisite: senior status. (Spring—day)

172 **Control Systems** (3)

Mathematical models of linear systems; steady-state and transient analyses; root locus and frequency response methods; synthesis of linear feedback control systems. Prerequisite: ApSc 114, EE 12 or ME 134. (Spring—day and evening)

177 **Electrical Energy Conversion** (3)

Fundamentals of electromechanical energy conversion. Electromechanical transducers and their equivalent circuits, three-phase and single-phase a-c rotating machines, d-c machines, rotating machines as circuit elements. Prerequisite: EE 12, 31. (Offered every spring—day; spring 1976 and alternate springs—evening)

178 **Electrical Power Systems** (2)

Introduction to electrical power systems; transmission and distribution of electrical power, three-phase circuits, symmetrical components, fault analysis by digital computer. Load-flow studies, economic considerations. Power station designs and synchronization of generators. Methods of generating electrical power. Prerequisite: EE 177, senior status. (Spring—evening)

184 **Introduction to Medical Engineering** (3)

Designed to introduce the engineering or physical sciences student to the applications of engineering in the medical sciences; terminology of the medical profession emphasized; the physiology of the human body presented from over-all systems or functional approach; survey of present-day medical measurements and consideration of those areas in which engineering may be applied advantageously to medicine. May be taken for graduate credit. Admission by permission of instructor. (Spring—day and evening)

198 **Research** (1 to 3)

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

COMPUTER SCIENCE COURSES

51 **Applications of Computers** (3) (Same as EE 51)

Introduction to the solution of problems on a digital computer using FORTRAN and BASIC languages; data processing concepts and numerical methods using batch and interactive time-shared terminal computer systems; writing, debugging, and running programs on various digital computer systems. (Fall—day and evening; spring—evening)

52 **Computers and Societal Problems** (3) (Same as EE 52)

Use of the digital computer in the analysis and modeling of social and urban systems. Applications of analytical methods to the solution of environmental and economic problems. Computer methods used in the simulation of physical, ecological, social, urban, and economic systems. Students formulate problems and simulate systems on a digital computer to obtain solutions. Prerequisite: CSci or EE 51 and two years of college preparatory mathematics. (Spring)

152 **Introduction to Digital Computers** (3) (Same as EE 152)

Introduction to the use and structure of minicomputers and larger com-
puters. Boolean algebra and the design of combinational switching
cuits. Number systems, codes, and arithmetic operations in digital com-
puters. Digital computer subsystems and their interconnections. Interfac-
ing equipment to a minicomputer; timing, control, and electronic requi-
ments. Introduction to programming analog computers; analog comput-
components; analog-to-digital conversion. Prerequisite: CSci or EE 1
(Offered every spring—day; spring 1976 and alternate springs—evening

153 **Design of Switching Systems** (3) (Same as EE 153)

Switching algebra and Boolean logic; sets, relations, and lattices. Analy
and design of switching devices; design of combinational logic networ
Minimization techniques and decomposition methods. Electronic imple-
mentation of logic; contact networks, symmetric functions, and threshold
logic. Reliable design and fault-detection tests. Number systems and code
geometric interpretation, error detecting and correcting codes; encoders and
decoders. Logic and electronic design of functional digital units. Sequen-
tial circuits and iterative networks. Minimization and transformation of
sequential machines; structure of sequential machines; partitions and co
ers. State identification and fault-detection experiments. Prerequisite (CS
or EE 152 or permission of instructor. May be taken for graduate credit
(Fall—day and evening)

154 **Digital Computer Design** (3) (Same as EE 154)

Logic and electronic design of functional digital units. Design of digital
computer subsystems, flow of information and logical flow diagrams
timing and control signals. Design of binary and decimal, serial and pa
allel digital arithmetic units. Design of memory subsystems, channels, I
and storage subsystems. Design of the control unit of a digital com-
puter. Introduction to microprogramming. Design of a small digital com-
puter. Prerequisite: CSci or EE 153 or permission of instructor. May b
taken for graduate credit. (Spring—day and evening)

155 **Introduction to Numerical Methods for Computers** (3)
(Same as EE 155)

Use of numerical methods in engineering and scientific problems. Con
cepts of algorithm and flowchart, errors in computer and numerical meth
ods. Introduction to numerical methods for the solution of simultaneous
linear algebraic equations, roots of equations, determination of eigenvalues
and eigenvectors, numerical differentiation and integration, interpolation
and solution of ordinary and partial differential equations. Statistical meth
ods for the evaluation of experimental data and correlation techniques
curve fitting. Prerequisite: ApSc 114, CSci or EE 51; or equivalent
(Offered every spring—day; spring 1977 and alternate springs—evening

156 **Introduction to Systems Programming** (3) (Same as EE 156)

Introduction to computer software systems; concepts in the use of macro
assemblers, loaders, monitors; dispatchers, initiators, and executive sys-
tem. Control of input-output in a multiprogrammed batch environment.
Control of the job, task, job stream, and secondary storage subsystems.
Introduction to simulation and simulation languages. Prerequisite or co-
current registration: CSci or EE 159. (Offered every spring—day
spring 1977 and alternate springs—evening)

157 **Machine and Assembly Language Programming** (3) (Same as EE 157)

Machine and assembly language programming for minicomputers and multiprogrammed large computers. Techniques in on-line terminal programming. Methods of addressing and machine control for fixed and variable word length computers. Input-output control and programming for minicomputers. Use of a macro-assembler, subroutine linkages, coroutines, reentrant and recursive routines. Methods of editing and debugging. Characteristics of minicomputer structure. Prerequisite: CSci or EE 51 or equivalent. May be taken for graduate credit. (Fall—day and evening)

158 **Algorithmic Methods and High-level Languages** (3) (Same as EE 158)

Introduction to high-level procedural and problem-oriented languages. Comparison of computer languages and their structure. Introduction to compiler structure and parsing of compiler statements. Reentrant programming and reentrant compilers. Correctness of programs. Syntax of high-level languages and their recognizers. Introduction to deterministic and probabilistic simulation and simulation languages. Introduction to heuristic programming. Prerequisite or concurrent registration: CSci or EE 157, 159; or permission of instructor. May be taken for graduate credit. (Fall—day and evening)

159 **Programming and Data Structures** (3) (Same as EE 159)

Introduction to discrete structures and data structures in computing. Use of tree structures, arrays, lists, pushdown stacks, files, strings, and linked data structures. Sorting, searching, hashing, and merging of data files. Use of macro-assembler to structure data. Data management and data storage. Use of buffers and buffer management. Input-output of data files. List and string processing languages and recursive programs. Access methods and operating system procedures for use with data structures and macro-assemblers. Prerequisite: CSci or EE 157 or equivalent, or permission of instructor. (Fall—day and evening)

GRADUATE STUDY

Electrical engineering, at the graduate level, provides one of the most stimulating experiences in advanced studies. The student has reached a degree of maturity and basic knowledge that allows him to enter into new avenues of exciting work. Courses prepare the student in areas of concentration such as systems science, networks, and controls; electrophysics (electronics, fields and waves); communications; medical engineering; and computer science (hardware and software). Depending upon the interest of the student, some of the programs leading to the degree of Master of Science are given at the NASA-Langley Research Center, Langley Station, Hampton, Va. NASA-Langley's extensive scientific and engineering facilities and equipment are utilized whenever feasible. Arrangements can also be made to use the facilities of the Naval Ship Research and Development Center, Annapolis, Md., where an off-campus Master's degree pilot program has been initiated.

The graduate programs are formulated to take into consideration the student's individual strengths, potentials, skills, aspirations, and abilities. Determined through consultation by the student and his faculty adviser, their purpose is to provide the student with a thorough understanding of his area of

concentration and at the same time to provide him with the breadth of knowledge necessary in modern engineering.

The graduate programs are, in addition, designed to provide a needed educational service to the Washington technical community. Many of the courses have been developed after consultation with private industry and government agencies of the area. They are offered during both the afternoon and evening with a principle of rotation from year to year.

The Department of Electrical Engineering and Computer Science has continuously kept the graduate program up to date, through constant contact with recent developments, through its own research, and through the addition of several experts in appropriate fields serving as part-time and adjunct faculty. The Department provides a well-balanced, modern graduate program.

To provide the student with detailed information about its graduate program from the point of view of procedures, requirements, regulations, and scope, the Department of Electrical Engineering and Computer Science publishes annually a detailed brochure to supplement the present catalogue. In addition, the Department publishes special pamphlets describing specific programs.

AREAS OF CONCENTRATION

Communications

EE 204:	Stochastic Signals and Noise
EE 205:	Stochastic Processes in Electrical Engineering
EE 241:	Information Theory
EE 242:	Coding Theory
EE 243:	Communication Theory I
EE 244:	Communication Theory II
EE 245:	Signal Detection and Estimation Theory
EE 246:	Digital Communications
EE 247:	Communication Systems
EE 248:	Microwave Communication Systems
EE 249:	Data Telecommunication Networks
EE 252:	Digital Signal Processing Techniques
EE 253:	Sonar Systems
EE 254:	Radar Systems
EE 257:	Issues in Computer Communications
EE 277:	Space Communication Systems
EE 298:	Research
EE 299–300:	Thesis Research
EE 345:	Advanced Detection Theory
EE 349:	Communication Research
EE 399:	Dissertation Research

Computer Science (Hardware and Software)*

CSci 201:	Introduction to Computer Systems I
CSci 202:	Introduction to Computer Systems II
CSci 214:	Data Structures
CSci 216:	Information Retrieval Systems

* See also preparatory undergraduate courses in Electrical Engineering and Computer Science, pp. 107–115.

CSci 219: Interactive Computer Graphics
CSci 220: Pattern Recognition
CSci 223: Simulation and Heuristics
CSci 231: Finite State Machines
CSci 232: Finite Automata
CSci 237: Computing Systems
CSci 239: Comparative Computer Systems
CSci 240: Theory and Practice of Microprogramming
CSci 245: Advanced Computer System Theory I
CSci 246: Advanced Computer System Theory II
CSci 255: Formal Languages, Correctness, and Structured Programming
CSci 256: Design of Translators
CSci 263: Digital Computer Programming Systems
CSci 267: Operating Systems I
CSci 268: Operating Systems II
CSci 278: Analog and Hybrid Computers
CSci 284: Applications of Numerical Methods
*CSci 285: Approximation of Functions and Data Representations
CSci 298: Research
Sci 299–300: Thesis Research
CSci 391: Computer Science Research
CSci 399: Dissertation Research

lectrophysics (Electronics, Fields and Waves)

EE 201: Natural Modes and Transients in Electrical Systems
EE 206: Electromagnetic Theory and Applications I
EE 207: Electromagnetic Theory and Applications II
EE 221: Physical Electronics I
EE 222: Physical Electronics II
EE 224: Quantum Electronics of Masers and Lasers
EE 225: Nonlinear Electronics
EE 226: Optical Electronics
EE 227: Industrial Electronics
EE 228: High-frequency Electronics
EE 229: Precise Optical Measurements
EE 231: Field Analysis and Potential Theory
EE 232: Electrodynamics
EE 233: Microwaves and Components
EE 234: Electromagnetic Wave Propagation
EE 235: Antennas
EE 236: Plasma Dynamics
EE 238: Precise Microwave Measurements
EE 239: Precise Electrical Standards
EE 255: Optical Processing
EE 256: Environmental Optics
EE 298: Research
EE 299–300: Thesis Research
EE 323: Principles of Microelectronics
EE 329: Electronics Research
EE 339: Fields and Waves Research
EE 399: Dissertation Research

*Offered at NASA-Langley Research Center; may be offered on campus when arranged.

Medical Engineering

EE 256: Environmental Optics
EE 281: Medical Instrumentation I
EE 282: Medical Instrumentation II
EE 283: Introduction to Medicine for Engineers I: Physiology and Anatomy
EE 284: Introduction to Medicine for Engineers II: Clinical Medicine
EE 285: Engineering in Physical Medicine and Rehabilitation
EE 286: Sensory Evoked Potentials
EE 287: Computer-aided Analysis of Physiological Signals
EE 288: Physiological Controls and Systems
EE 298: Research
EE 299–300: Thesis Research
EE 389: Medical Engineering Research
EE 399: Dissertation Research

Systems Science, Networks, and Controls

EE 201: Natural Modes and Transients in Electrical Systems
EE 202: Linear System Theory I
EE 203: Linear System Theory II
EE 204: Stochastic Signals and Noise
EE 205: Stochastic Processes in Electrical Engineering
EE 212: Advanced Network Analysis
EE 213: Computer-aided Analysis and Design of Networks
EE 215: Linear Network Synthesis I
EE 216: Linear Network Synthesis II
EE 272: Discrete Systems
EE 273: System Optimization
EE 274: Nonlinear Systems
EE 275: System Identification and Adaptive Systems
EE 276: Cybernetics
EE 278: Spacecraft Systems Design
EE 298: Research
EE 299–300: Thesis Research
EE 319: Networks Research
EE 371: Simulation Methods for System Analysis
EE 372: Analysis and Control of Large Systems
EE 379: Controls and Systems Research
EE 399: Dissertation Research

ELECTRICAL ENGINEERING COURSES

201 Natural Modes and Transients in Electrical Systems (3)
Transient response and natural modes of electrical systems; techniques analyzing systems with periodic and aperiodic inputs and outputs; pling. (Fall and spring)

202 Linear System Theory I (3)
Graph theory and its application to networks and systems; system des tion in time and frequency domain; linear spaces and linear operat mathematical representation of linear systems; analytical and comp solutions of the state equations; transient and steady-state response. requisite: graduate status. (Fall—evening)

203 Linear System Theory II (3)
System properties; controlability and observability of linear systems;

sitivity and stability analyses. Irreducible realizations of rational transfer-function matrices; canonical forms, state feedback, and state estimators. Linear composite systems. Prerequisite: EE 202. (Spring—evening)

204 **Stochastic Signals and Noise** (3)

Probability, random variables, characteristic functions; transformations of random variables and applications; sequences of random variables, linear mean-squared estimation; stationary estimation, stationary random processes, correlation functions, power spectrum; output of linear systems with stochastic inputs: Gaussian processes. Applications drawn for communications, control theory, computer science. (Fall and spring—evening)

205 **Stochastic Processes in Electrical Engineering** (3)

Markov chains, state classification, Kolmogorov equation; applications to probabilistic finite-state machines. Birth-death process, applications to queuing theory, buffer problems, and the design of communication nets. Continuous state processes, diffusion processes, passage times, and estimation problems. Estimation and power spectra. Stochastic difference and differential equations. Applications to communication theory, control theory, computer science, and propagation theory of random media. Prerequisite: EE 204 or equivalent. (Spring—evening)

206 **Electromagnetic Theory and Applications I** (3)

Brief review of vector-phasors and Maxwell's equations, electromagnetic potentials, power and energy; plane waves, frustrated total reflection, skin effect, anisotropic media; solution of radiation problems in the Kirchoff approximation; elementary applications. Prerequisite: EE 133 or equivalent. (Fall—evening)

207 **Electromagnetic Theory and Applications II** (3)

Introduction to advanced techniques for problems in electromagnetics; leaky waves and complex wave-types, stationary phase and steepest descent approximations for integrals in the complex plane. Discrete and continuous spectra. Application to optical fibers, surface and leaky wave antennas, ground wave propagation. Prerequisite: EE 201 or equivalent, EE 206. (Spring—evening)

212 **Advanced Network Analysis** (3)

Network theorems, network functions, relationship of parts of network functions; network properties, realizability and causality concepts; computer-aided network analysis. Prerequisite: EE 201, 202 or equivalent. (Spring 1977 and alternate springs—evening)

213 **Computer-aided Analysis and Design of Networks** (3)

Description and use of network analysis programs such as ECAP, CORNAP, and NASAP. Algorithmic methods for time and frequency domain analysis of networks using a digital computer, numerical solution of state equations, fast Fourier transform, network design by optimizing searches on digital computers, synthesis of electrical networks using unconstrained optimization techniques in the time domain, network design through approximation such as Fourier series, Chebyscheff functions, and Padé approximation. Prerequisite: EE 51, 212. (Fall 1975 and alternate falls—evening)

215 **Linear Network Synthesis I** (3)

Properties and testing of positive real functions. Synthesis of LC, RL, RC

one-port networks. Brune, Bott-Duffin, Miyata, Kuh, and Darlington s
thesis techniques. Introduction to two-port ladder and lattice synthe
Three-terminal RC network synthesis approximation in the frequency
time domains. Prerequisite: EE 113 or permission of instructor.
(Fall 1976 and alternate falls—evening)

216 Linear Network Synthesis II (3)

Advanced topics in passive one-port and two-port synthesis. Introducti
to n-port synthesis. Active network synthesis using negative resistan
controlled sources, NIC, gyrator, operational amplifiers, and circulato
Synthesis of distributed integrated networks. Computer-aided netw
optimization. Prerequisite: EE 215. (Spring 1977 and alternate spri
—evening)

221 Physical Electronics I (3)

Theoretical principles underlying the operation of electronic devices; cl
sical mechanics and classical statistical mechanics, the quantum theo
wave and matrix mechanics, quantum statistics. Prerequisite: EE
(Fall—evening)

222 Physical Electronics II (3)

The Boltzmann transport equation, band theory of solids, time-depende
perturbation theory, group theory. Applications to semiconductor
other solid-state devices such as transistors, tunnel diodes, masers, p
lasers. Prerequisite: EE 221. (Spring—evening)

224 Quantum Electronics of Masers and Lasers (3)

Basic concepts from quantum mechanics; Einstein coefficients; inversi
and pumping mechanisms; rate equations. Resonators. He-Ne laser
ganic dye lasers; injection lasers. Nonlinear interactions in lasers. Pr
requisite: EE 222 or equivalent. (Fall 1976 and alternate fa
evening)

225 Nonlinear Electronics (3)

Analysis and design of electronic components and systems operating
switching, sweeping, gating, and pulse generators; study of multivibrato
negative resistance devices and amplifiers, nonlinear operation of osc
tors. Prerequisite: EE 122, CSci or EE 153; or equivalent. (Fa
evening)

226 Optical Electronics (3)

Principles of optical systems, aberrations, and optical resonators; quanti
theory of radiation, coherence and detection of radiation; lasers, holo
graphy, optical (spatial) filtering, and nonlinear optics. Prerequisite:
207 or equivalent. (Spring 1977 and alternate springs—evening

227 Industrial Electronics (3)

Applications of electronic devices in industry; continuous and sampled
control systems; induction and dielectric heating; timing and counti
circuits; reliability and automatic checking equipment; digital control
machine tools. Prerequisite: EE 122 or equivalent and graduate stan
(Spring 1977 and alternate springs—evening)

228 High-frequency Electronics (3)

Design and analysis of the operation of electron-tube, solid-state, cross
field, space-charge wave, and quantum maser oscillators and amplifie

devices that lay the foundation of modern-day communication systems. Prerequisite: EE 207 or equivalent. (Spring—evening)

229 **Precise Optical Measurements** (3)

Optical constants of lens systems; aberration; resolving power; illumination in focal plane; image evaluation, magnification, index of refraction; color and color temperature. Prerequisite: graduate status. (Fall—evening)

231 **Field Analysis and Potential Theory** (3)

General study of the theory of potentials as used to facilitate solution of problems in electromagnetic theory, mechanics, thermodynamics, optics, and gravitation. Emphasis on mathematical methods such as Green's functions, variational methods, principal axis transformations, and multidimensional Fourier transforms. Prerequisite: EE 207. (Fall 1976 and alternate falls—evening)

232 **Electrodynamics** (3)

Special theory of relativity and the Lorentz transformation; Minkowski formulation. Maxwell's equations in the context of special relativity, electromagnetic potentials, and stress tensors. Lagrangian and Hamiltonian formulations, radiation from moving charges. Introduction to quantum electrodynamics. Prerequisite: EE 207. (Spring 1976 and alternate springs—evening)

233 **Microwaves and Components** (3)

High-frequency transmission lines and guided systems; matching techniques; scatter ferrite isolators, gyrators; Faraday rotation; microwave networks; directional couplers; cavity resonators and microwave components. Prerequisite: EE 207. (Fall—evening)

234 **Electromagnetic Wave Propagation** (3)

Retarded time scalar, vector, and Hertz potential. Dipole and dipole array fields; Mie theory of electromagnetic scattering by spheres. Propagation in electrically and magnetically anisotropic media such as dielectric crystals, space-charge plasmas, and ferrites. Wave propagation in inhomogeneous media; Liouville transformation, Lagrange's variation of parameters, WKB solution, invariant imbedding techniques. Propagation in stochastic and dispersive media. Prerequisite: EE 207. (Fall 1975 and alternate falls—evening)

235 **Antennas** (3)

General solution of Maxwell's equations in terms of current sources, the far field approximations, radiation from current distributions, field equivalence theorems, the geometrical optics approximation, aperture antennas, receiving antennas, the theory of arrays, and applications to specific antennas and antenna types. Prerequisite: EE 207. (Spring—evening)

236 **Plasma Dynamics** (3)

Study of the interaction of fluids with electromagnetic fields. Generalized Navier-Stokes and energy equations, magnetogasdynamic and magnetohydrodynamic approximations, boundary-layer theory, statistical theory of turbulence, generalized Von Karman-Howarth equation, Boltzmann transport equation. MHD generators and devices. Prerequisite: EE 207. (Spring 1976 and alternate springs—evening)

238 **Precise Microwave Measurements** (3)

Precise measurement of power, frequency, impedance, wavelength, and at-

tentuation at microwave frequencies; characteristics and Q of resonant c vices; calibration of microwave components; design of microwave expe ments. Prerequisite: EE 207 or equivalent. (Spring—evening)

239 **Precise Electrical Standards** (3)

Concepts of standards, errors; design of resistance, capacitance and i ductance standards; d-c voltage standards; frequency and time standa dielectric and magnetic materials, attenuation standards, power standa transfer standards. Prerequisite: EE 160 or equivalent. (Spring—ev ning)

241 **Information Theory** (3)

Measure of information, noiseless coding; communication channels, cha nel capacity, the noisy channel coding theorem; bounds on the perfor ance of communication system; the Gaussian and binary symmetric cha nel; feedback communications systems; rate-distortion theory. Prereq site: EE 204. (Fall—evening)

242 **Coding Theory** (3)

Error-correcting codes; bounds on the performances of error-correctin codes, group codes; syndrome decoding; cyclic codes, their encoding an decoding; Galois fields; BCH codes, burst correction, and threshold- codeable codes; performance calculations. (Spring—evening)

243 **Communication Theory I** (3)

Optimum receivers for vector channels and for the additive white Gau sian noise channel; correlation detectors, matched filters; coherent and noncoherent detection and their error probabilities for simplex, orthog nal, and coded systems; bounds on the performance of communication in Gaussian noise; comparison of communications systems. Prerequisi EE 204 or equivalent. (Fall—day and evening)

244 **Communication Theory II** (3)

Schemes for efficient signaling for data sequences; effects of quantizing i the receiver; detection of such signals in colored noise; detection of sto chastic signals; the innovations approach in detection and estimation problems; signaling over fading channels and the optimum receivers, di versity techniques and their performances. Prerequisite: EE 243. (Spring—day and evening)

245 **Signal Detection and Estimation Theory** (3)

Statistical detection theory, hypothesis testing, sequential detection, estim tion theory, maximum likelihood and Bayes methods, estimation of sto parameters and continuous wave forms, Wiener and Kalman filters, app cations to the design of optimum receivers, adaptive systems. Prerequisi EE 241, 244; or equivalent. (Fall—evening)

246 **Digital Communications** (3)

Bounds on the performance of data communications; channels with lin dispersion; intersymbol interference and its minimization; Nyquist criteri eye openings, tail cancellation techniques, correlative coding, transver equalizers, adaptive equalizers; broadband, noise limited channel; orth gonal codes, simplex codes, bounds on error probability; reception matched filters, "Green machine," and other techniques; convolution codes; decoding by sequential decoding and Viterbi decoding; performan analysis. Prerequisite: EE 241, 244; or equivalent. (Spring—evenin

247 **Communication Systems** (3)

Wiener filters, phase-locked loops and their optimization. Parameter estimation theory with application to optimum demodulation of analog wave forms (DSB-AM, SSB-AM, FM). Comparative analysis of analog modulation systems. Digital communication systems—coherent and noncoherent reception of binary and M-ary signals and their performance analysis. Frequency acquisition and synchronization. Prerequisite: EE 241, 244. (Fall—evening)

248 **Microwave Communication Systems** (3)

Analysis and design of communication links for terrestrial, satellite, and over-the-horizon scatter radio channels. Propagation effects and channel characterization including refraction, reflection, multipath, scattering, and absorption. Effects of earth curvature and characteristics of over-land and over-water propagation. Antenna considerations including gain, directivity, polarization, and antenna patterns. Frequency and time-division multiplexing and modulation techniques. Effects of noise interference and fading. Diversity techniques. Characteristics of satellite repeaters. Prerequisite: EE 206, 244. (Spring—evening)

249 **Data Telecommunication Networks** (3)

Techniques for the analysis and design of data networks with store, forward, and message switching capability, queuing theory, Erlang's formula, priority systems; optimization based on minimization of message delay; synchronous and asynchronous multiplexing; topological problems, graph theory, connectivity and survivable networks, probabilistic graphs; data networks with a central computer; terminal oriented systems. Prerequisite: EE 205 or equivalent. (Fall—evening)

*250 **Telecommunication Systems Concepts** (3)

Essential elements of an electrical communication system, speech, TV, and data signals; spectrum, bandwidth, sampling. Amplitude, frequency, and pulse code modulation and comparative performance. Multiplexing schemes, communication quality standards, and objectives. Signal power, noise power, distortion, and channel capacity. Probability, traffic theory, reliability, voice, TV, and data transmission. Telecommunication, microwave radio, cable, and satellite communications systems.

*251 **Survey of Telecommunication Systems** (3)

Design of a communications link for voice, TV, and data. Loading; the switched telephone network. Transmission system layout and major design considerations. Over-all system design of microwave radio system. Radiowave propagation fundamentals. Satellite communications, factors affecting the choice of orbit and orbital separation of satellites, satellite transponder. Major design consideration and values of significant parameters for a typical satellite communications link. Over-all design of a cable communication system. Digital transmission and terminals. Wideband data transmission. Frequency allocation.

252 **Digital Signal Processing Techniques** (3)

Digital signal processing and data reduction techniques; applications to communications, controls, image enhancement, radar, and speech processing. Least-squares fitting of polynomials; sampling and quantization. Re-

* EE 250 and 251 cannot be applied toward a Master's or Doctor's degree in the School of Engineering and Applied Science.

cursive and nonrecursive digital filter design. Generation and shaping of pseudo-random noise. Estimation of correlation functions and spectral densities. Digital processing for Kalman Bucy filters. Extraction of signal and timing from noise. Fast Fourier and Hadamard transforms. Software and hardware implementation of signal processing algorithms. Prerequisite: EE 51 or equivalent; EE 204. (Fall—evening)

253 **Sonar Systems** (3)
Underwater sound propagation; transducer and transducer arrays; detection, dislocation, and tracking techniques; array processing; time compression correlation and digital processing of signals; effects of nonhomogeneous noise fields; applications to navigation and communications in the ocean environment. Prerequisite: EE 244. (Fall—evening)

254 **Radar Systems** (3)
The radar equation, range and resolution limits; MTI radars; detection and estimation techniques; clutter characteristics and detection in clutter; signal design; ambiguity functions; Doppler radar; phased arrays; synthetic aperture techniques; digital and optical processing and computer control. Applications. Prerequisite: EE 206, 244. (Spring—evening)

255 **Optical Processing** (3)
Fourier transforms by diffraction of light, optical spectrum analysis, optical memories and systems, holography and holographic techniques, properties and techniques for photographic reproduction. Prerequisite: EE 2[illegible] (Fall—evening)

256 **Environmental Optics** (3)
Distribution of radiation: power converting and transferring systems; UV, luminous, IR spectral sources; daylight; moonlight; luminaries. Environmental boundaries—transmission, reflection, diffusion, refraction, diffraction, dispersion, bleaching, phototropy, polarization. Simulation of organismic responses: response definition—physiological, overt behavioral, perceptual, cognitive. Stimulus-response correlation model; correlating measurement concepts. (Fall—evening)

257 **Issues in Computer Communications** (3)
Fundamentals of data communications and systems, integrating computer and telecommunications, modems, multiplexers, concentrators and [illegible] Networks of computers: distributed and centralized. Network organization: circuit-switched, store-and-forward, and packet-switched. System design considerations; management factors; economic and regulatory issues; changes in technology; effect on systems cost-performance; regulation; value-added networks. (Spring—evening)

272 **Discrete Systems** (3)
Sampling processes and theorems; Z-transforms and modified Z-transforms; responses of discrete systems using transformation techniques and state equations; stability criteria; design of digital controller for discrete systems. Prerequisite: EE 203 or equivalent. (Spring 1976 and alternate spring —evening)

273 **System Optimization** (3)
Parameter optimization problems; theory of minima and maxima. Optimization problems for dynamic systems; calculus of variations; the maximum principle and the Hamilton-Jacobi equation. Optimization problems with constraints; optimal feedback systems. Numerical solution of optimal problems. Prerequisite: EE 203 or equivalent. (Fall—evening)

274 Nonlinear Systems (3)

Definition of linear and nonlinear systems; introduction to approximate analysis of nonlinear systems—describing functions, Krylov and Bogoliubov's asymptotical method and Tsypkin's locus. Forced oscillations—jump resonance. Stability analysis—Liapunov's criterion, Lurć's problem, and Popov's method. Prerequisite: EE 203. (Spring 1977 and alternate springs—evening)

275 System Identification and Adaptive Systems (3)

Introduction to the adaptive problem and practical applications. Determining the mathematical representation of systems—the identification problem. Optimal estimation of states in the presence of uncertainties. Adaptive systems. Prerequisite: EE 203, 204; or equivalent. (Fall 1976 and alternate falls—evening)

276 Cybernetics (3)

Principles of machines or mechanisms made by men or nature with regard to their ways and forms of possible behaviors: regular, determinate, or reproducible; fundamental concepts of finite differences; changes and transformations as sets of transitions, leading to stability and feedback; statistical concepts of complex systems and blackbox theory; Shannon's information theory; regulation and control of mechanisms. Prerequisite: graduate status and ApSc 115 or equivalent. (Fall 1975 and alternate falls—evening)

277 Space Communication Systems (3)

Theoretical and application aspects of space communications, as related to communication satellite systems, scientific satellites, manned space missions, and deep space missions. Prerequisite: EE 244. (Fall—evening)

278 Spacecraft Systems Design (3)

Space environment; structure, propulsion, control, and instrumentation of spacecraft—launch, orbit, transit, and re-entry problems; bioastronautic considerations. Prerequisite: graduate status. (Spring—evening)

281 Medical Instrumentation I (3)

Theory of measurements in biological areas, techniques for electronic measurements on biological specimens, current problems in medical metrology stressing electronic systems. Prerequisite: EE 283 or permission of instructor. (Fall—evening)

282 Medical Instrumentation II (3)

Medical telemetry systems, medical use of the computer, engineering techniques in patient treatment, principles of good medical instrumentation. Prerequisite: EE 283 or permission of instructor. (Spring—evening)

283 Introduction to Medicine for Engineers I: Physiology and Anatomy (3)

Designed to acquaint the engineering student with the physiology of the human body; material based on the curriculum of the School of Medicine and taught from a systems viewpoint; concepts of cellular structure and function integrated into the tissue and organs, which are then related to the various systems of the body; interrelationships of the body systems, i.e., the interaction of the nervous system with the musculoskeletal system or the interaction of the respiratory system and its functions with the cardiovascular system. (Fall—day)

284 Introduction to Medicine for Engineers II: Clinical Medicine (3)
Clinical aspects of medicine. Further elaboration of physiological systems, such as the endocrine system, renal physiology, gastrointestinal physiology, and others; the separate systems of the body are integrated to present the functioning of the body as an over-all system; considerable interaction with physicians and other medical personnel. Prerequisite: EE 283. (Spring—day)

285 Engineering in Physical Medicine and Rehabilitation (3)
Application of engineering theory and techniques to the rehabilitation of handicapped persons: major problem areas and general approaches, as well as specific solutions. Offered cooperatively with personnel from the Social and Rehabilitation Services Administration. Prerequisite: EE 284. (Fall—evening)

286 Sensory Evoked Potentials (3)
Physiological significance of the sensory evoked potential, stimulative variables, subject variables, data acquisiton procedures and instrumentation, signal-averaging computers, analysis techniques for the VEP, applications of the VEP. Lectures, discussion, and laboratory. Prerequisite: EE 281, 282, 283, 284; or permission of instructor. (Spring—evening)

287 Computer-aided Analysis of Physiological Signals (3)
Computer analysis of physiological data obtained from the cardiovascular, pulmonary, and nervous systems. Sources and detection of various signals obtained from these systems; algorithmic techniques applicable to the analysis of these signals; students provided with real data, obtained from hospital patients, and required to develop computer software for determining pertinent medical parameters as established by physicians. Prerequisite: EE 281, 282, 283, 284; and a working knowledge of FORTRAN. (Fall—evening)

288 Physiological Controls and Systems (3)
Some applications of control and systems theory in the medical and biological fields. Application of general control and systems theory as applied to physiological systems. Specific applications of control and systems theory to the visual system, respiratory system, cardiovascular system, and musculoskeletal system. Prerequisite: EE 172 or equivalent; EE 281, 282, 283, 284. (Spring—evening)

298 Research (arr.)
Research as arranged. May be repeated for credit. (Fall and spring)

299–300 Thesis Research (3–3)
(Fall and spring)

319 Networks Research (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

323 Principles of Microelectronics (3)
Basic principles, techniques, and processes necessary for understanding microelectronics. Semiconductor physics, phase diagrams, crystal growth, epitaxy, vacuum techniques, thin-film deposition, diffusion, oxidation, junction formation, masking, and properties of thin films and materials. Prerequisite: EE 222 or equivalent. (Spring 1977 and alternate spring —evening)

329 **Electronics Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

339 **Fields and Waves Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

345 **Advanced Detection Theory** (3)

Review of general estimation equations. Linear estimation; Weiner and Kalman-Bucy filters; nonlinear modulation theory; angle-modulation systems, analysis and design of phase-lock loops, optimum angle-modulation, rate distortion theory; Gaussian processes in Gaussian noise, detection and parameter estimation, canonical receivers, structures, and performance calculations for diversity systems, multiple pulse radars, stationary processes and threshold receivers. Prerequisite: EE 245. (Spring—evening)

349 **Communications Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

371 **Simulation Methods for System Analysis** (3)

Survey of simulation languages. Techniques of model building for material- and machine-based systems. Treatment of these systems with notion of transactions and states. Modeling the dynamic processes of growth problems. Analog, hybrid, and digital methods for simulation treated by means of case studies; speed and cost of alternate computing procedures. Project-type problems used to illustrate simulation methods. Prerequisite: CSci 278 or permission of instructor. (Fall 1975 and alternate falls —evening)

372 **Analysis and Control of Large Systems** (3)

Systems as multistage decision processes. Analytical concepts of model-making and matrix representations of large systems. Approximation by models of lower dimension—reduction to simplified models; decentralized systems. Differential games; computation of saddle points; construction of an equilibrium point. Prerequisite: EE 273. (Spring 1976 and alternate springs—evening)

379 **Controls and Systems Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

389 **Medical Engineering Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

COMPUTER SCIENCE COURSES

201 **Introduction to Computer Systems I** (3)

Introduction to programming digital computers in a macro-assembly language and higher-level procedural languages; techniques in machine con-

trol and memory addressing. Characteristics of different computer structures and the programming of such machines. Introduction to the structure of compiler languages; parsing of compiler language statements. Characteristics and choice of data processing languages. Prerequisite: CSci or EE 51 or equivalent, assembly language programming experience and permission of instructor. (Fall and spring—evening)

202 **Introduction to Computer Systems II** (3)

Introduction to combinational and sequential logic networks; analysis and synthesis of switching circuits using Boolean algebra; minimization techniques in the design of logical circuits; number systems and arithmetic in digital computers, digital computer architecture and the design of functional sub-units; design of memory, arithmetic, and units comprising a digital computer; information flow, timing, and control in large digital computers. Prerequisite: CSci 201 or permission of instructor. (Spring—evening)

214 **Data Structures** (3)

Introduction to discrete structures. Computer data structures; arrays, items, pointers, lists, insertion and deletion, available space management, threaded lists, two-way lists, garbage collection and compactification. Pushdown stacks, strings, and files. Trees and hash table searching; bubble, radix and merge sorting. Sequential, indexed sequential, and random files; access methods; sorting of files. Subroutines, co-routines, macros, flags, relocation and recursion. Buffer and buffer management, data management and storage. List and string processing languages. Prerequisite: CSci 201, or CSci or EE 158. (Spring—evening)

216 **Information Retrieval Systems** (3)

Information organization and retrieval of natural language data by digital computer systems; statistical, syntactic, and logical analysis of natural language used for retrieval systems; dictionary systems including thesauri, look-up and phrase structures; searching strategies and cataloguing. Input preparation and output structures; large-scale file structures and operating systems required for their use. Prerequisite: CSci 214, or CSci or EE 158, or permission of instructor. (Spring—evening)

219 **Interactive Computer Graphics** (3)

Display devices. CRT, point plotting and vector generation, character generators; display files, data structures, linear and area transformations, clipping and windows; graphic input devices; interrupt handling; scaling; perspective, projection, hidden line elimination; command languages, time-shared interactive graphics, software support. Prerequisite: CSci 214 or CSci or EE 158; or permission of instructor. (Fall—evening)

220 **Pattern Recognition** (3)

Applications of pattern recognition, vector spaces, estimation and sampling, Bayes estimation; density functions; stochastic approximation; decision rules in pattern recognition, minimal risk, Gaussian filters; bounds of risk, nearest-neighbor decision rules; clustering techniques, feature extraction, pattern recognition with *a priori* knowledge. Prerequisite: CSci 214 and EE 204. (Spring—evening)

223 **Simulation and Heuristics** (3)

Techniques of deterministic and probabilistic simulation on the digital computer. Mathematics for simulation; design of systems modules; random

number generation and testing. Markovian and bounded context systems; generation of stochastic variates; Monte Carlo techniques; heuristics; verification techniques; simulation languages. Prerequisite: CSci 201, or CSci or EE 157, and permission of instructor. (Fall—evening)

231 **Finite State Machines** (3)

Abstract algebraic foundations using set theory, including operators, relations, mappings, homomorphisms, lattices, and mathematical systems such as groups and semigroups. Sequential machine (finite state machines) theory including state representation and identification, Moore and Mealy machines, reduction and equivalence of completely and incompletely specified machines, partitions and covers, and composition and decomposition. Prerequisite: CSci or EE 153 or CSci 202. (Fall—evening)

232 **Finite Automata** (3)

Neural networks from an engineering point of view. Regular expressions including equality and transformations between sequential machine notation and regular expression notation. Turing machines and the basis of computability and complexity. Formal language theory including grammatical construction, recognizers, relationships between machines, and grammars and ambiguity. Prerequisite: CSci 231. (Spring—evening)

237 **Computing Systems** (3)

Organization of large digital computer systems. Design of high-speed arithmetic units. Random access and associative memories; rotational storage devices; computer control and interrupt structures. Input-output channels and interfacing problems. Communications in digital computers. Introduction to multiple access and time-sharing systems. Prerequisite: CSci or EE 154 or CSci 202. (Fall—evening)

238 **Advanced Computing Systems** (3)

Multiple access computer systems, multiprogramming, multiprocessing, and time-sharing. Real-time computation; man-machine communication problems, and remote I/0 devices. Memory allocation and protection. Secondary storage organization and retrieval. Effects of storage on program operation. Design of file structures. Analytical time-sharing models, scheduling schemes, and user response time. Prerequisite: CSci 237. (Spring—evening)

239 **Comparative Computer Systems** (3)

Structures of computers and a general language for system description. History of different computer structures. Development of the operating system. Special purpose processors. Multiprocessors and large computing systems. Computer networks and time-shared systems. Comparison of computer families. Characteristics and philosophies of computer design of the major manufacturers. Introduction to performance evaluation and measurement. Effects of software and technology on computer structures. Prerequisite: CSci 237, 263. (Spring—evening)

240 **Theory and Practice of Microprogramming** (3)

Basic concepts, techniques, and theory of microprogramming as applied to the implementation of control systems for sequential machines. Microprogramming languages, assemblers, and hardware simulators, including specific applications of these to the design of current computer systems and their interfaces with real-time systems. Prerequisite: CSci 237, 263. (Spring—evening)

245 Advanced Computer Systems Theory I (3)

Analytical models applied to computing systems. Determinance, dea locks, concurrency, and synchronization of computer processes. Optim task scheduling using linear graph theory. Concurrent processes in mult processors. Analysis of the overlap of I/O and CPU processing. Queu theory applied to time-shared computer models. Analysis of second storage devices and effective data rate. Analysis of memory buffer poo and multiprogrammed memory allocation. Memory allocation and sto age heirarchy operation and their effect on throughput and respons time. Prerequisite: CSci 237, 263; EE 204. (Fall—evening)

246 Advanced Computer Systems Theory II (3)

Optimum secondary storage placement algorithms to improve throughp Modeling of secondary storage operation and data staging. Analysis o memory allocation algorithms to improve system performance. Chara teristics of computer system hardware and software to provide for mul processing, multiprogramming, and time-shared operation. Loosely an tightly-coupled multiprocessors. Analysis of front-end processors in da base operation and computer networks. System analysis of a large, time shared, terminal-oriented transaction processing system. Prerequisit CSci 245. (Spring—evening)

255 Formal Languages, Correctness, and Structured Programming (3)

Introduction to formal computer languages. Structured programmin and block-oriented languages. Regular, context-free, context-sensitive and unrestricted grammars. Parsing a language, syntax of languages pushdown automata and their use in compiling. Top-down structured programming. Avoidance of GO TO statements. Correctness, termination and equivalence of programs. The inductive assertion method. Termin tion methods based on well-ordered sets. Assertion languages, program schemes, fixed point methods, and inductive principles. Prerequisite: CSc 214. (Fall—evening)

256 Design of Translators (3)

Design of procedure-oriented computer languages. Semantics and prag matics as they affect the design of translators, interpreters, and compilers Top-down and bottom-up recognizers. Production of machine code Syntax-directed compiling. Tables and their organizations in translators Optimizing compilers; compiler-compilers. Prerequisite: CSci 255. (Spring—evening)

263 Digital Computer Programming Systems (3)

Design of computer systems software. Use of a macro-assembler and job control language. Design of assemblers and loaders. Concepts of multiprogrammed job control including linking, loading, linkage-editing relocatability, and status switching. Design of dispatchers and monitors Communications between components of an operating system. Input output programming and control. Design of utility programs. Prerequi site: CSci 214 or permission of instructor. (Fall—evening)

264 Design of Compilers and High-level Languages (3)

Design of high-level, procedural-oriented languages. Theory of formal languages and their grammars. Parsing the language. Syntax of the lan guage and its recognizers. Semantics and pragmatics as they affect the design of translators and compilers; correctness of programs; context-free languages; top-down and bottom-up recognizers. Tables and their organi

zation in compilers; optimizing compilers and production of machine code. Prerequisite: CSci 214, or CSci or EE 158; or permission of instructor. (Spring—evening)

267 **Operating Systems I** (3)

Introduction to the operating system for batch-operated multiprogrammed computer systems. Software components which constitute the operating system. Facilities of the macro-assembler which utilize the operating system; loading and linking routines; initializing programs and tasks; dispatching and the interrupt mechanisms. Memory management in fixed and variable partitions; device and storage management. Input-output control and use of access methods. Performance evaluation of a multiprogrammed batch-operated system. Prerequisite: CSci 263. (Fall—evening)

268 **Operating Systems II** (3)

Introduction to operating systems for time-shared and multiprocessor computer systems. Processor management in a multiprocessor system; deadlocks, processor utilization, and I/O management. System availability and fail-soft mechanisms. Time-slicing and time-sharing operating systems and subsystems; transaction processing subsystems; memory management in a paged and segmented virtual memory system. Performance of the operating system. Computer network software and an introduction to the computer as a utility. System security and large data base systems. Prerequisite: CSci 267. (Spring—evening)

278 **Analog and Hybrid Computers** (3)

Analog computer components and electronics. Slow analog computer solutions of linear and nonlinear differential equations. System simulation and modeling on the analog computer. Introduction to the iterative analog computer. Transfer function simulation and use in control theory. The hybrid computer, digital logic and digital computer control. Digital-to-analog and analog-to-digital converters and interfaces. Optimization methods on a hybrid computer. Parameter variations and searching methods. Prerequisite or concurrent registration: CSci 202, or CSci or EE 154; or permission of instructor. (Fall—evening)

284 **Applications of Numerical Methods** (3)

Numerical methods in scientific and engineering problems; development of computer algorithms for the solution of numerical problems; error analysis and sensitivities of numerical methods; use of a procedural computer language in the solution of numerical methods; computer methods for simultaneous equations, interpolation, differentiation and quadrature, solution of ordinary differential equations, boundary-value problems, partial differential equations, and linear algebra. Prerequisite: CSci or EE 51 or equivalent and permission of instructor. (Spring—evening)

*285 **Approximation of Functions and Data Representations** (3)

Review of linear spaces; least squares, orthogonal functions; nonlinear techniques, gradient search methods; parameter estimation with discrete data; Tchebysheff approximation; approximation and curve fitting by Spline functions and Bernstein polynomials.

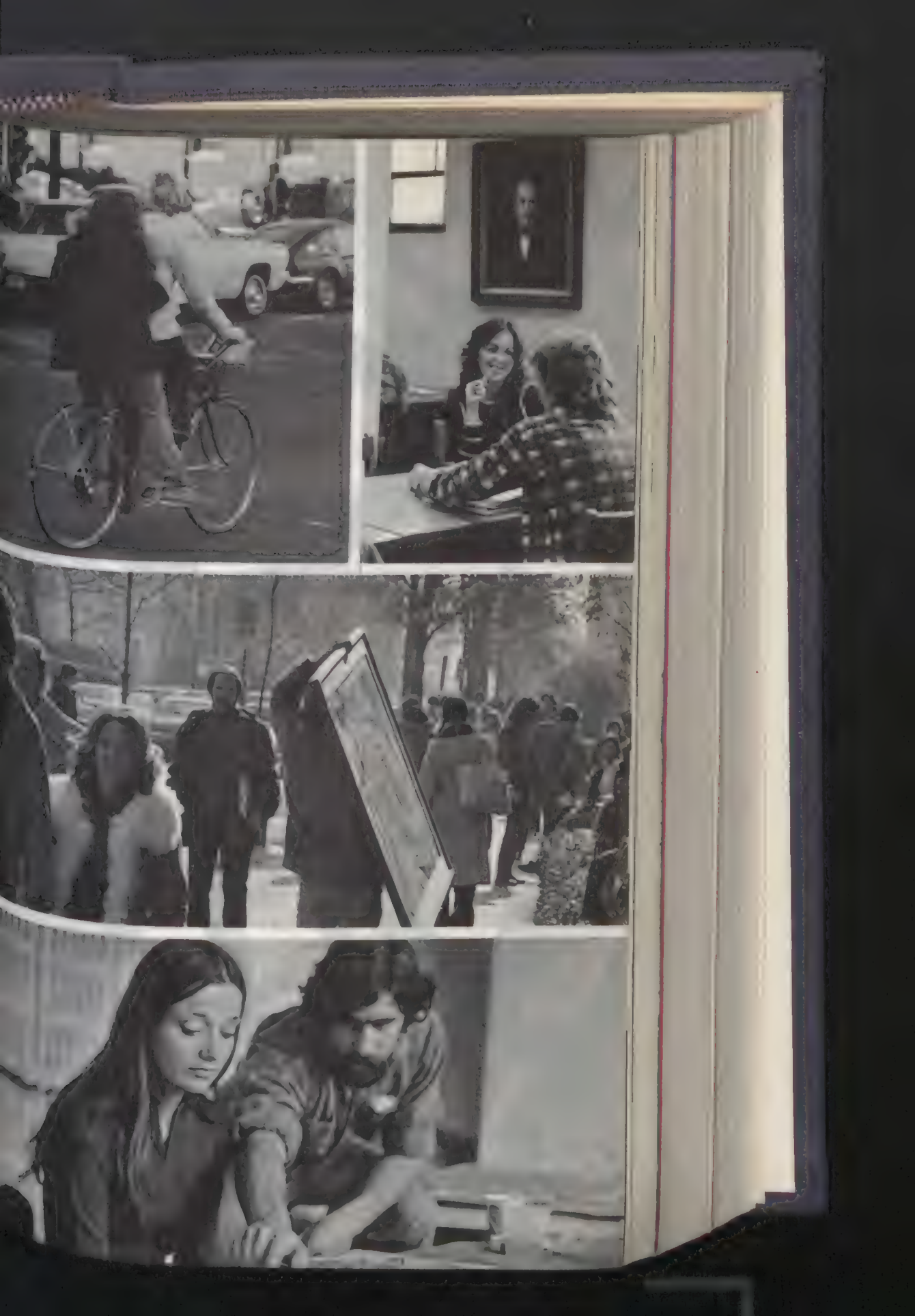
* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

298 Research (arr.)
Research as arranged. May be repeated for credit. (Fall and spring)

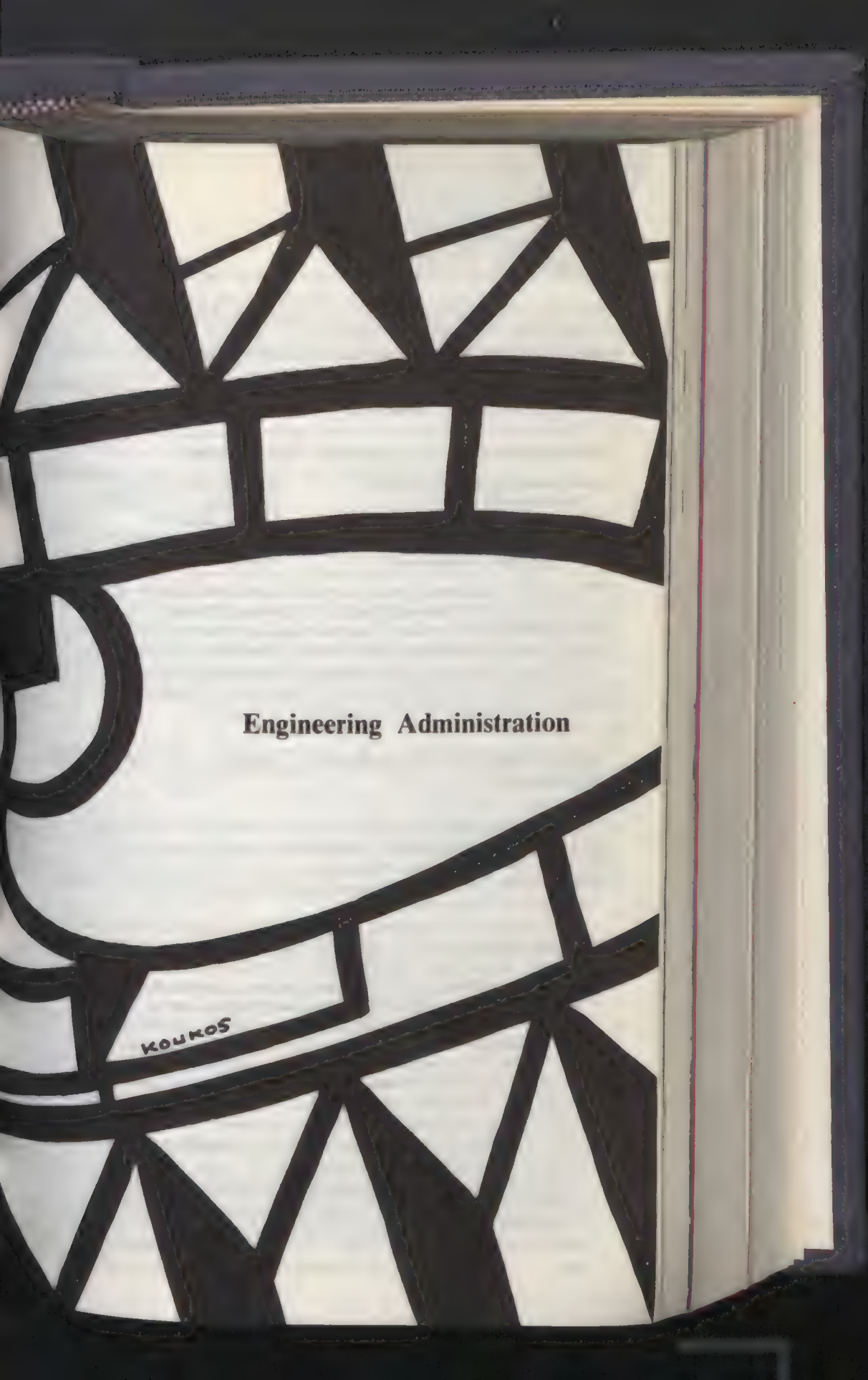
299–300 **Thesis Research** (3–3)
(Fall and spring)

391 Computer Science Research (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.)
Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)







Engineering Administration

Engineering Administration

Professors P.A. Crafton, P.S. Shane, John Kaye, Maurice Apstein *(Research)*, Sam Rothman *(Chairman)*
Professorial Lecturers D.P. Boyd, B.B. Bright, G.M. Coburn, R.L. Bangert
Associate Professor J.B. Smith, Jr.
Associate Professorial Lecturers J.E. Just, J.S. Pachter, Ernst Volgenau
Assistant Professorial Lecturers R.E. Sears, W.A. Goetz

GRADUATE FIELDS AND AREAS OF CONCENTRATION

Administration of Research and Development
Construction Management
Engineering Administration
Environmental Management
Management Information Systems
Marketing of Technology
Systems Analysis
Technology and Public Affairs
Transportation Management

Programs in Engineering Administration lead to the degrees of Master of Engineering Administration and Doctor of Science. Programs in Administration of Research and Development, Construction Management, Environmental Management, Management Information Systems, Marketing of Technology, Technology and Public Affairs, and Transportation Management lead to the degree of Master of Engineering Administration. Programs in Systems Analysis lead to the degrees of Master of Science and Doctor of Science.

THE MASTER OF ENGINEERING ADMINISTRATION DEGREE PROGRAM

The principal objective of the program leading to the degree of Master of Engineering Administration is to prepare students whose undergraduate education was in engineering, mathematics, or science for positions of management responsibility in technological and scientific organizations in industry, government, or the armed services.

The program is designed to help the student achieve a broad understanding of the administrative process. Although years of experience are required to develop the skills, insight, and mature judgment which distinguish an effective manager in technological and scientific organizations, a graduate professional management curriculum can give the student an effective start as a manager. The curriculum provides an opportunity for the student to gain an understanding and develop useful managerial skills in the functional areas of engineering administration. One of the major purposes is to assist the student in forming the habit of examining problems from an over-all administrative point of view. The individual's own particular experience, and the explicit process of relating this experience to graduate study, provides each student with a personal frame of reference through which he may interpret management in a rapidly changing world.

Successful education for engineering administration implies a clear understanding of what it is that an engineering manager must do, an analysis of the broad functions involved in management, and a detailing of modern methods useful in making and executing decisions in the management of technological

and scientific organizations. It is the aim of the School, therefore, to keep alive a spirit of general inquiry and a decision-making orientation.

The management of technological organizations is one of the most difficult challenges of our times. The professional engineering manager today must understand not only currently developing technologies but also the rapidly changing marketplace where these technologies are applied for society's benefit. The engineering administrator is the link between these dynamic technologies and the needs of society in general.

In summary, the program of study has for its objective an educational experience which will contribute to the development of managers possessing a combination of technical know-how and administrative skill.

ADMISSION

In addition to the requirements for admission to graduate study (see pages 23–24) applicants for programs leading to the degree of Master of Engineering Administration are required to meet the following requirements: (1) The applicant must have an adequate knowledge of the principles of human relations, the fundamentals of engineering economic analysis, and the fundamentals of quantitative methods. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: EAd 150, *Introduction to Engineering Administration;* EAd 160, *Introduction to Engineering Economic Analysis;* and EAd 170, *Basic Quantitative Methods for Engineering Administration.* (2) The applicant may be required to complete other undergraduate prerequisite courses prescribed as a condition of admission. (3) A student is required to earn the grade of *C* or better (unless the requirement is stipulated to be a grade of *B* or better upon his admission) in each undergraduate prerequisite course. If this scholarship requirement is not met the student is barred from further enrollment. A student is not permitted to repeat any of the undergraduate prerequisite courses. Credit for prerequisite courses is not applicable toward the degree of Master of Engineering Administration, and all prerequisite courses must be completed prior to taking graduate courses in this degree program.

ADMINISTRATION OF RESEARCH AND DEVELOPMENT

The objective of the program of study in the field of Administration of Research and Development is to prepare students for responsible managerial positions in organizations conducting technological or scientific research and development and in organizations planning and administering programs of technological or scientific research and development.

REQUIRED COURSES

A program of study consisting of a sequence of courses is prescribed for each student in conference with an adviser. Students are required to complete EAd 207, 211–12,* 255, 269,* 295, and 299–300 (for those electing the thesis program) or 297 (for those not electing a thesis); the remainder of the program is selected from courses in the Department of Engineering Administration.

* EAd 211–12 and 269 must be taken at the beginning of the program of study.

CONSTRUCTION MANAGEMENT

Construction Management encompasses those managerial functions in an organization that plans and executes major construction work. This can take place in the field, in the project office, or in a main office. Due to the inherent complexity of present-day engineering, engineers need to know management as well as basic planning, design, and construction methods. They need to know construction developments, problems of contracts and specifications, techniques of scheduling and control, estimating, labor relations, and industrial or management psychology.

The objective of the program of study in the field of Construction Management is to prepare the engineer for the task of marshalling men, materials, machines, and money against time, cost, weather, and human nature to plan and build structures.

REQUIRED COURSES

Students are required to complete EAd 211–12,* 241, 242, 269,* and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected, with the approval of the student's adviser, from courses in the Department of Engineering Administration, the Department of Civil, Mechanical, and Environmental Engineering, and other departments of the University.

ENGINEERING ADMINISTRATION

Study in engineering administration provides the conceptual depth in management practice and knowledge needed by technical and scientific personnel who are confronted with increasing demands and mounting complexities. Technical knowledge is complemented by an understanding of theory and practice in management action. Engineering management is a logical development of a technological society. The program of study is designed to provide engineers with a knowledge of and proficiency in the administration of engineering and science. It emphasizes use of deliberative, purposive study of general administrative problems and opportunities, as well as the study and use of specific knowledge and methods needed to solve administrative problems and to explore opportunities.

REQUIRED COURSES

Analysis, case study, and quantitative approaches are emphasized in addition to technical reviews of administration. A program of study consisting of an integrated sequence of courses is prescribed for each student in conference with an adviser. Students are required to complete EAd 211–12,* 269,* and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is elective. EAd 211–12 and 269 must be taken prior to the elective courses, except that in certain cases permission may be obtained for concurrent registration. Electives are chosen from the Department of Engineering Administration and other departments of the University, but no more than two courses may be chosen from other departments.

* EAd 211–12 and 269 must be taken at the beginning of the program of study.

ENVIRONMENTAL MANAGEMENT

The objective of the program of study in the field of Environmental Management is to prepare students for responsible managerial positions in organizations conducting environmental control and in organizations planning and administering programs in the prevention and control of environmental pollution.

REQUIRED COURSES

Students are required to complete EAd 211–12,* 221–22, 261, 269,* and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected, with the approval of the student's adviser, from appropriate courses in the Department of Engineering Administration, the Department of Civil, Mechanical, and Environmental Engineering, and other departments of the University.

MANAGEMENT INFORMATION SYSTEMS

The objective of the program of study in the field of Management Information Systems is to provide the developing manager in technological and scientific organizations with the understanding and competence in the managerial use of systems that furnish quickly to management information in the variety of forms that are required for day-to-day operations and long-range decisions.

REQUIRED COURSES

Students are required to complete EAd 211–12,* 269,* 295, 321, and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected from courses in the Department of Engineering Administration, and, with the approval of the student's adviser, in other departments of the University.

MARKETING OF TECHNOLOGY

As the American economy matures and American citizens survey the broad spectrum of options available to them, it is apparent that scientific and engineering outputs must be sold in world-wide competition both at home and abroad. The trained specialist is becoming more important than ever before in performing the selling function.

The objective of the program of study in the field of Marketing of Technology is to prepare students for responsible positions in marketing technical products and services.

REQUIRED COURSES

Students are required to complete EAd 211–12,* 269,* 293, 294, 311, and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected from courses in the Department of Engineering Administration.

* EAd 211–12 and 269 must be taken at the beginning of the program of study.

TECHNOLOGY AND PUBLIC AFFAIRS

The objective of the program of study in the field of Technology and Public Affairs is to prepare students for responsible positions requiring managerial decision-making on matters that involve the impact of technology on public policy and that concern the general interrelationship between modern technology and public affairs.

REQUIRED COURSES

Students are required to complete EAd 211-12,* 269,* and 299-300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected, with the approval of the student's adviser, from courses in the Department of Engineering Administration, the National Law Center, and other departments of the University.

TRANSPORTATION MANAGEMENT

The objective of the program of study in the field of Transportation Management is to prepare students for responsible positions in the management of transportation systems or the formulation of transportation policy.

REQUIRED COURSES

Students are required to complete EAd 211–12,* 265, 266, 269,* and 299-300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected from courses in the Department of Engineering Administration, and with the approval of the student's adviser, in other departments of the University.

THE MASTER OF SCIENCE DEGREE PROGRAM

SYSTEMS ANALYSIS

The program of study in the field of Systems Analysis leads to the degree of Master of Science and is administered by the Department of Engineering Administration.

The objective of this program is to prepare students whose undergraduate background training was in engineering, mathematics, or science for responsible positions in the practice of systems analysis.

ADMISSION

The admission requirement for the Master of Science degree in the field of Systems Analysis is a Bachelor's degree in engineering, mathematics, or the sciences from a recognized institution. An applicant may be required to complete undergraduate prerequisite courses prescribed as a condition of admission. Such courses are not applicable toward the Master of Science degree and must be completed prior to taking any graduate courses in this program.

* EAd 211–12 and 269 must be taken at the beginning of the program of study.

REQUIRED COURSES

Students are required to complete EAd 281–82, 283, 284, and 299–300 (equivalent to 6 semester hours for those electing a thesis) or 9 semester hours of approved courses (of which one must be EAd 297) in lieu of EAd 299–300. The remainder of the program is selected, with the approval of the student's adviser, from courses in the Department of Engineering Administration and other departments of the University.

EAd 281–82, 283, and 284 must be taken prior to any other courses in this program of study.

DOCTORAL STUDY

Programs in Engineering Administration and in Systems Analysis leading to the degree of Doctor of Science provide advanced study and research to enable gifted students to extend their knowledge and to enhance their career opportunities in research or education.

ADMISSION TO DOCTORAL STUDY

All applicants must meet the general requirements for admission to doctoral study stated on pages 27–28.

Applicants for doctoral study in Engineering Administration must have a Master's degree, with a superior record of academic achievement in Engineering Administration or a related field. Applicants for study in Systems Analysis must have a Master's degree, with a superior record of academic achievement in Systems Analysis or a related field.

As part of the admissions condition for doctoral study (1) in fields of Engineering Administration, superior performance on the comprehensive examination for the degree of Master of Engineering Administration, or (2) in Systems Analysis, superior performance on the comprehensive examination for the degree of Master of Science (Systems Analysis), is required before work for the doctoral program may be undertaken. Outstanding professional performance is also considered in evaluating all doctoral applicants.

PROGRAMS OF STUDY

Major fields leading to the degree of Doctor of Science are available in fields of Engineering Administration and in Systems Analysis. In addition to the major field, one or two minor areas of concentration are normally required, which may be chosen from the areas administered by this Department and/or from appropriate areas available in other departments of the University. The general requirements for doctoral study are stated on pages 28–31.

COURSES

UNDERGRADUATE

150 **Introduction to Engineering Administration** (3)
(Formerly Introduction to Technical Management)
The interrelationships of engineering, science, and management; conceptual

foundations for interaction of human factors in individuals, groups, a the social environment of engineering activities. Familiarization w typical activities of engineering managers and with factors bearing on t motivation of engineers and on engineers as managers. Social and ganizational factors relevant to the management of engineers. This cou is preliminary to the complete management process studied in EAd 211-1

160 **Introduction to Engineering Economic Analysis** (3)

Influence of the time element: interest rates, equivalence, present wor annual cost, internal rate of return. Incremental analysis. Data for ana sis. Characteristics of an accounting system: balance sheet, profit and l statement, depreciation, allocation of fixed costs, financial statement ana sis.

170 **Basic Quantitative Methods for Engineering Administration** (3)

An introductory treatment of quantitative tools and techniques import in engineering administration, with emphasis on their application. Co cepts of probability and decision-making in administrative decisions. (Fall and spring)

GRADUATE

201 **Management for Engineers and Scientists** (3)

Basic principles of engineering administration: management function planning, organizing, directing, and controlling; emphasis on industri scientific, and engineering environments. Open to students in progr outside the Department of Engineering Administration and open to can dates for the Master of Science degree in the School of Engineering a Applied Science. May not be taken by candidates for the degree of M ter of Engineering Administration or for the degree of Doctor of Scie with a major field in Engineering Administration. Open to advanced u dergraduate students with permission of instructor. Students who rece credit for EAd 201 cannot receive credit for EAd 211–12.

204 **Administration of Engineering Contracts** (3)

Study of the total contracting process, including initial budget prepara and justification, actions leading to the execution of a contract, and a ministration of the contract to completion; considered from the viewp of the industrial and government buyer and the seller of technical m rials and services. (Fall and spring)

207 **The Personnel Function for Engineering Administrators** (3)

Principles of managing human talent, the most vital resource in engine ing or research; emphasis on principles, theory, and practical consid tions of the personnel function for engineering managers, with practi applications in an engineering administration environment. (Fall a spring)

210 **Engineering Law** (3)

Legal principles and procedures of interest to engineers, the Americ legal system, contracts and specifications, liability of professional en neers, antitrust problems, agency relationships, negotiable instruments, P ent and proprietary rights, special problems in research and developme contracts. (Fall and spring)

211–12 **Engineering Administration** (3–3)

Comprehensive and systematic study of the administrative process; industrial, scientific, and engineering environments. Planning: objectives, prediction, policies, plans and characteristics of plans. Organizing: theory of organization, structure, authority, specialization, delegation, staff and committees. Directing: leadership, managing human and material resources. Controlling: setting standards, evaluating performance, using system feedback data for correction and improvement. Students who receive credit for EAd 211–12 cannot receive credit for EAd 201. (EAd 211 and 212—fall and spring)

213 **Case Analysis in Engineering Administration** (3)

Written analysis and class discussion of cases involving application of the principles of engineering administration and use of the scientific method. (Fall 1976 and alternate falls)

221–22 **Environmental Management** (3–3)

Integration of social, technical, economic, and political forces which shape environment; review of government programs to combat air, water, solid waste, noise, and thermal pollution; conducting and analyzing a regional ecology system; legal aspects of environmental management; economic and technological impacts of environmental policies; effects of chemicals on ecology. Systematic waste management; social, political, and economic reactions to environmental policies. (Academic year)

231 **Program Management** (3)

Management science, the systems approach and traditional managerial concepts as applied to government and industry activities under program managers. Computer simulation of the management of a project to develop an earth satellite to the point of launch (GREMEX), with student participation. (Spring)

241 **Construction Management I** (3)

Contract negotiations; aspects of contracts and specifications important to management. Construction estimating and cost allocation in heavy and building construction; budgeting and accounting concepts. (Fall)

242 **Construction Management II** (3)

Construction administration: organization, construction planning, and scheduling. Industrial relations and human factors in construction management, work measurement, programming and progressing, project management and control. (Spring)

243 **Construction Management III** (3)

Managerial problems associated with advanced methods of construction and equipment; trend of mechanization; equipment policy and depreciation.

251 **Management of Computer Organizations** (3)

Planning, organizing, and control of computer operations. Management of a computer organization as an independent service bureau or as an integral part of a larger organization. Supervision of professional and subprofessional computer personnel. Prerequisite: EAd 211, 212.

253 **Production Management** (3)

Planning, organizing, and control of production; forecasting techniques;

material management; methods of loading and scheduling production pro
esses; electronic methods in production control. Organization and admi
istration of the plant engineering function with emphasis on maintenan
control programs. Prerequisite: EAd 269 or permission of instructo
(Spring)

254 **Automatic Data Processing Systems** (3)

Logic of computers, arithmetic and control units, systems analysis for da
processing applications, systems design, systems economics, relation
scientific decision processes. (Fall and spring)

255 **Administration of Research and Development** (3)

Study of contemporary practices of administrators of scientific and eng
neering research and development; the relation of these studies to a
cepted managerial concepts, and their effect on contemporary manageri
hierarchies and organizational structures. (Fall and spring)

261 **Economic Analysis in Engineering Planning** (3)

Important concepts and theories employed in economic analysis of eng
neering projects. Application of various analytical processes. Detailed
practice in pursuit of solutions to, and adjustment of, persistent and cu
rent problems in this field. Prerequisite: EAd 269 or permission of in
structor. (Fall and spring)

265 **Transportation Management I** (3)

Integration of social, technical, economic, and political considerations
which shape transportation systems and their management. Review o
local, state, and federal government programs in transportation. Conduc
ing a management study of a local, regional, or national system.

266 **Transportation Management II** (3)

Legal aspects of transportation systems and their management.

269 **Elements of Decision-making and Problem-solving** (3)

History and orientation of quantitative methods; concept of quantitati
decision-making; decision criteria under certainty, risk, and uncertaint
game theory; utility; the time factor; replacement models. Prerequisite
EAd 170 or equivalent. (Fall and spring)

281–82 **Systems Analysis and Management** (3–3)

Systems analysis as applied to management, especially the planning fun
tion. Properties, nature, structure, and organization of systems; concep
tualization of the total system. Operational functioning and descriptio
of systems. Objectives, alternatives, models, criteria, and feedback i
analytical considerations. Enterprises, input-output structure of the U
economy and organizations from the systems point of view. Case analyse
(Academic year)

283 **Systems Engineering I** (3)

Concept of system structure and organization. Linear and nonlinear sy
tems analysis; dynamics and stability of systems. Introduction to opt
mization methods. (Fall)

284 **Systems Engineering II** (3)

Design of systems; simulation and modeling of systems; adaptive system
system optimization. (Spring)

285 Seminar: Administrative Problems (3)

Individual analysis of complex administrative problems, with group evaluation and discussion. Prerequisite: 18 semester hours of graduate credit. (Fall and spring)

293 Technical Enterprises (3)

Essential features of technology-based companies; basic issues of planning, organizing, financing, and managing a new venture from the entrepreneur's point of view; case studies and a detailed plan for a venture. Designed for those within technical firms and those within government who depend on technical firms as suppliers. (Fall)

294 Marketing of Technology I (3)

Marketing of industrial goods and high-technology projects; emphasis on the federal government as the customer. Products, channels, organization, selling, technical service, and control; case analyses. (Spring)

295 Management of Technical Information (3)

Needs and objectives of technical information systems, functions involved in technical information, storage and retrieval, abstracting, computer usage in technical information systems, system organization. (Spring)

297 Problems in Engineering Administration (3)

Project course providing the student with the opportunity to apply the various concepts and tools previously studied to the solution of a problem in engineering administration. Students work individually or in small groups, each on a problem proposed by the student and approved by the instructor. (Fall and spring)

298 Research (arr.)

Basic or applied research in engineering administration or systems analysis. May be repeated for credit. (Fall and spring)

299–300 Thesis Research (3–3)

(Fall and spring)

311 Marketing of Technology II (3)

Continuation of EAd 294. Special attention to marketing research, negotiation, and international marketing. Required for Master's degree candidates in the Marketing of Technology program. Prerequisite: EAd 294. (Fall 1976 and alternate falls)

321 Management Information Systems (3)

Study and development of information systems used by middle and higher management of technological and scientific organizations in the control of many facets of the organization at all managerial levels. Required for Master's degree candidates in the Management Information Systems program. (Fall 1977 and alternate falls)

386 Advanced Topics in Management (3)

Reading and discussion of classic and important recent literature concerning the philosophy and application of management principles. (Fall 1977 and alternate falls)

387 Technological Forecasting (3)

Concepts and methodology: normative and exploratory forecasting, re-

source allocation and forecasting, technology transfer, technological cha
and its effects on forecasting, technology assessment. (Spring 1
and alternate springs)

388 **Cost Effectiveness** (3)

Concepts of evaluation of engineered systems, current methods and tre
in methodology, system resource requirements, probability and deci
theory in cost effectiveness studies, systems approach to cost effectiven
studies. (Spring 1977 and alternate springs)

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying exa
nation. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credi
(Fall and spring)


BULLETINS
MAP OF CAMPUS


Operations
Research

Operations Research

Professors W.H. Marlow *(Chairman)*, Donald Gross, N.D. Singpurwalla
Professorial Lecturers Byron Cosby, Jr., W.W. Wolman
Associate Professors C.M. Harris, J.E. Falk *(Research)*, A.V. Fiacco *(Research)*, G.P. McCormick *(Research)*
Associate Professorial Lecturers John Waller, C.C. Sherbrooke, K.D. Shere, J.W. Wingate
Assistant Professors J.D. Marsh, Jr., E.H. Forman *(Visiting)*
Assistant Professorial Lecturer A.L. Haines

Programs in Operations Research lead to the degrees of Master of Science and Doctor of Science.

MASTER'S STUDY

The objective of the program in Operations Research is to prepare students with appropriate undergraduate backgrounds for study in depth of analytically oriented techniques of management decision-making and their applications.

Expanded scientific, statistical, and mathematical knowledge, combined with growing needs in technological as well as social areas, have created increased demands for individuals trained in operations research. The discipline of operations research uses scientific principles supported by statistical and mathematical methodology to study the function and structure of complex technical, industrial, military, and social systems in an effort to evaluate the probable effects of proposed courses of action, to establish criteria to judge the effectiveness of these courses, and to assist in the making of optimal decisions. The program in Operations Research provides a scientific basis for solving problems involving the interaction of many factors and organizational components in the interests of the whole or total problem. This breadth of interest is an example of the "systems approach" in the sense that a system is an interconnected complex of functionally related components. Most operations research efforts begin with specific aspects of the general problem in such a way that it is possible to proceed to consideration of the system as a whole. Just as the engineer may start with the study of subsystems or components of a general problem, so may the operations research analyst.

ADMISSION

In addition to the requirements for admission to graduate study (see pages 23–24), the applicant for the program in Operations Research leading to the degree of Master of Science must have an adequate knowledge of probability and statistics. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: ApSc 115, *Engineering Analysis III;* and Stat 191, *Probabilistic Methods for Operations Research.*

REQUIRED COURSES

Core courses required in the field of Operations Research are OR 201, 202, 200, 210, and 299–300 (for those electing a thesis) or 291 (for those not electing a

thesis). Students must complete OR 201, 202, 209, and 210 before attempting any other courses; however, in certain cases, permission may be granted for concurrent registration. Students electing OR 291 normally complete this course in the last semester of the program. The remainder of the program is selected, with the approval of the adviser, generally in an area of concentration from courses in the Department of Operations Research. Appropriate courses from other departments of the University may also be approved as electives.

AREAS OF CONCENTRATION

The philosophy of the Department of Operations Research is to provide programs flexible enough to accommodate those whose interests lie in applications and those whose interests lie in theory. Specific areas of concentration and suggested departmental electives follow:

General Operations Research

OR 251: Linear Programming
OR 252: Nonlinear Programming
OR 261: Theory of Games
OR 275: Introduction to Scheduling
OR 277: Queuing Theory
OR 279: Inventory Control

With the approval of the adviser, other courses may be elected from the Department.

Management Science

OR 232: Applications of Linear and Nonlinear Optimization Theory
OR 237: Logistics Planning
OR 251: Linear Programming
OR 261: Theory of Games
OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation
OR 275: Introduction to Scheduling
OR 279: Inventory Control

With the approval of the adviser, courses may be elected from the departments of Business Administration, Economics, Engineering Administration, and Management Science.

Mathematical Modeling in Information Systems

OR 251: Linear Programming
OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation
OR 275: Introduction to Scheduling
OR 277: Queuing Theory

With the approval of the adviser, courses may be elected from the departments of Electrical Engineering and Computer Science and Management Science.

Mathematical Optimization

OR 251: Linear Programming
OR 252: Nonlinear Programming
OR 253: Integer and Discrete Programming
OR 261: Theory of Games
OR 275: Introduction to Scheduling

With the approval of the adviser, courses may be elected from Applied Science and the Department of Mathematics.

Model Building for Transportation Flows

OR 231: Theory of Traffic Flow
OR 232: Applications of Linear and Nonlinear Optimization Theory
OR 251: Linear Programming
OR 252: Nonlinear Programming
OR 273: Digital Systems Simulation
OR 277: Queuing Theory
OR 281: Reliability Theory I

With the approval of the adviser, courses may be elected from the departments of Civil, Mechanical, and Environmental Engineering; Engineering Administration; Urban and Regional Planning; and from the National Law Center.

Operations Research in Industrial Engineering Systems

OR 232: Applications of Linear and Nonlinear Optimization Theory
OR 237: Logistics Planning
OR 251: Linear Programming
OR 252: Nonlinear Programming
OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation
OR 275: Introduction to Scheduling
OR 277: Queuing Theory
OR 279: Inventory Control
OR 281: Reliability Theory I

Quantitative Decision-making for Public Policy

OR 232: Applications of Linear and Nonlinear Optimization Theory
OR 235: Operations Research in Public Policy
OR 236: Operations Research in Social Systems
OR 251: Linear Programming
OR 261: Theory of Games
OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation

With the approval of the adviser, courses may be elected from the departments of Civil, Mechanical, and Environmental Engineering; Economics; Public Administration; and Urban and Regional Planning.

Stochastic Modeling

OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation

OR 277: Queuing Theory
OR 279: Inventory Control
OR 281: Reliability Theory I

With the approval of the adviser, courses may be elected from the Department of Statistics.

DOCTORAL STUDY

Programs in Operations Research leading to the degree of Doctor of Science provide advanced study and research to enable the student to extend his field of knowledge and to enhance his career opportunities in research, analysis, management, administration, or education.

ADMISSION

In addition to the general requirements for admission to doctoral study (see pages 27–28), the applicant for the doctoral program in Operations Research must have a Master's degree, with a superior record of academic achievement. Outstanding professional performance is also considered in evaluating applicants.

PROGRAMS OF STUDY

Doctoral programs are planned so that the student may obtain an adequate breadth in operations research and sufficient depth in areas of specialization to permit him to complete a dissertation that will be a significant contribution to the field. Possible areas of concentration include mathematical programming, inventory, queuing, reliability, and traffic theory. In addition to the major in Operations Research, two minor areas of concentration are normally required. One minor area must be in Applied Science, Mathematics, or Statistics. The second minor area may be chosen from areas of concentration within the Department or from appropriate areas available in other departments of the University, such as Business Administration; Civil, Mechanical, and Environmental Engineering; Economics; Electrical Engineering and Computer Science; Engineering Administration; Health Care Administration; Management Science; Mathematics; and Urban and Regional Planning. The general requirements for doctoral study are stated on pages 28–31.

GRADUATE COURSES

201 **Survey of Operations Research Methods I** (3)
Basic concepts and techniques of operations research as applied to problems in industrial, governmental, and military decision-making. Allocation models including the simplex procedure of linear programming, transportation and assignment models, queuing theory, inventory theory, game theory, and decision-making under uncertainty. Prerequisite: ApSc 115 or equivalent. (Fall and spring)

202 **Survey of Operations Research Methods II** (3)
Simulation, Monte Carlo techniques; networks; integer programming; t
troduction to nonlinear programming; dynamic programming; reliabili
and replacement. Prerequisite: OR 201 or equivalent. (Fall and spring

209 **Mathematics in Operations Research I** (3)
Fundamental methods and practical procedures for deterministic decisio
models in operations research involving a number of variables. Applic
tions of linear models for resource allocations. Applications to data re
resentation and algorithmic procedures for linear and nonlinear optimiz
tion models. Applications of linear algebra and real multivariate analys
(Fall)

210 **Mathematics in Operations Research II** (3)
Fundamental methods and practical procedures for stochastic decisio
models in operations research involving applications of complex variable
Applications of linear differential, difference, and differential-differenc
systems to various areas in operations research. Applications of moder
numerical methods. (Spring)

231 **Theory of Traffic Flow** (3)
Definitions and measurement of traffic stream parameters; dynamic the
ories: follow-the-leader models of traffic flow; kinematic theories and flu
analogies; traffic cybernetics; statistical distributions and queuing theor
stochastic approaches to static delay problems; simulation of traffic prob
lems. Prerequisite: ApSc 115 or equivalent. (Spring 1977 and alte
nate springs)

232 **Applications of Linear and Nonlinear Optimization Theory** (3)
Introduction to penalty-function and arc methods for solving linear an
nonlinear optimization problems through use of existing computer code
Formulation of optimization models in application areas of structural de
sign, nutrition, pollution control, resource allocation, biology, economic
psychology, statistics, and chemical processes. Admission by permission
instructor. (Fall)

235 **Operations Research in Public Policy** (3)
Quantitative methods in health, education, and welfare. Health planning
models, hospital operations analysis, analysis of educational systems, an
welfare planning. Case studies include medical manpower planning, ho
pital admissions systems, comprehensive health care planning mode
assessment of effects of innovation in education, determination of welfa
priorities, and resource allocation in welfare problems. Prerequisite:
knowledge of calculus and fundamentals of probability and statistics. M
be repeated for credit. (Fall)

236 **Operations Research in Social Systems** (3)
Quantitative methods in urban development and the administration of j
tice. Studies of police operations; models for court management; analys
of correctional problems; location of public facilities; scheduling and ro
ing problems; manpower usage; passenger, freight, and vehicular traf
problems; housing problems; models of emergency operations. Prereq
site: knowledge of calculus and fundamentals of probability and statistics
May be repeated for credit. (Spring)

237 **Logistics Planning** (3)
Quantitative methods in model building for logistics systems including

ganization, procurement, transportation, inventory, maintenance, and their interrelationships. Applications stressed. Prerequisite: ApSc 115 or equivalent. (Spring 1976 and alternate springs)

251 **Linear Programming** (3)

Basic computational, theoretical, and applied areas with emphasis on the general linear programming problems; simplex procedures; duality problems; parametric linear programming and sensitivity analysis, transportation problems. (Fall and spring)

252 **Nonlinear Programming** (3)
(Formerly Nonlinear and Dynamic Programming)

Basic topics in optimization theory, including convex sets and functions, first- and second-order optimality criteria, and algorithms. Methods for solving unconstrained problems; linearly and nonlinearly constrained problems, and certain problems with special structures. Applications discussed where appropriate. (Spring)

253 **Integer and Discrete Programming** (3)

Methods and applications of optimization problems requiring integral solutions. Cutting plane methods, branch and bound methods, group theoretic methods. Dynamic programming. Network programming: shortest route problems, max flow problems. Prerequisite: OR 202 or 251; or permission of instructor. (Fall)

261 **Theory of Games** (3)

Study of mathematical models with applications to the relationships among independent competitive entities (persons or organizations in environment of competition, bargaining, bidding), selection of optimum strategies, minimax concept, connections with linear programming and decision functions, two-person and n-person zero and nonzero sum games. (Fall)

271 **Forecasting Techniques** (3)

Regression analysis and its use as a forecasting tool; uses and limitations of time-series analysis in forecasting; business indicators and index numbers. Introduction to spectral theory; correlogram, periodogram, and special density. Prerequisite: ApSc 115 or equivalent. (Spring 1976 and alternate springs)

273 **Digital Systems Simulation** (3)

Monte Carlo techniques, random number and random deviate generation. Simulation languages. Operating considerations, including model validation, steady-state, and statistical analyses of simulation output. Applications in inventory, queuing, and production scheduling. Prerequisite: ApSc 115 or equivalent and knowledge of FORTRAN, or BASIC. (Spring 1977 and alternate springs)

275 **Introduction to Scheduling** (3)

Theory of scheduling with emphasis on industrial applications; assembly line balancing; sequencing and scheduling of jobs in machine shops. Mathematical optimization, heuristic programming, and computer simulation approaches to these problems are examined. Prerequisite: OR 202 or permission of instructor. (Fall 1976 and alternate falls)

277 **Queuing Theory** (3)

Characterization of queuing systems. Single-channel exponential models. Additional Markovian single- and multiple-channel models, including birth-

death processes, finite sources, bulk queues, Erlangian models, and seri queues. Models with general arrival and/or service patterns. Mod building and basic solution techniques are stressed in addition to formu theoretical developments. (Spring)

279 **Inventory Control** (3)

Application of mathematical techniques to decisions regarding when and how much to produce or purchase. Various mathematical models of in ventory systems with deterministic and stochastic demands, continuou and periodic review policies, multi-item models with constraints. Demand uncertainty and forecasting in inventory models. Prerequisite: ApSc 1 or equivalent. (Fall)

281 **Reliability Theory I** (3)

Review of estimation procedures, regularity conditions for maximum lik lihood estimators, limit theorems, order statistics, and extreme value theory; probabilistic derivation of failure models from hazard-rate and renewal-theoretic considerations; topics in censored, truncated, and ac celerated life tests for exponential and extremal types of distributions emphasizing linear and minimum-risk invariant estimators; sequential analysis and sequential life testing in both classical and Bayesian frame works; nonparametric characterization of failure distributions and mathe matical properties of failure-rate functions. Prerequisite: Stat 191. or equivalent. (Fall)

291 **Problems in Operations Research** (3)

Field experience in operations research on a team basis. Each small group locates an actual problem and formulates solution by operations research models. Class evaluation of progress. (Spring)

297 **Special Topics in Operations Research** (3)

Selected topics in operations research, as arranged. Prerequisite: permis sion of instructor. May be repeated for credit. (Fall and spring)

298 **Research** (arr.)

Basic or applied research in operations research. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

351 **Advanced Topics in Mathematical Programming** (3)

Special topics, including geometric programming, branch and bound methods, max-min problems, pseudo-Boolean programming, calculus of variations, optimal control, and large-scale programming. Prerequisite: OR 252 or permission of instructor. (Fall 1977 and alternate falls)

361 **Games, Decisions, and Value Theory** (3)

General structure of statistical games: concepts of utility and optimal strategies, the invariance principle, sequential decision processes, Bayes procedures in games. Principles of value theory: measurement of relative values, metagames, and the dominance principle. Prerequisite: OR 25 Stat 191; or permission of instructor. (Spring 1977 and alternate springs)

371 Advanced Topics in Forecasting (3)

Model estimation using maximum likelihood and Bayes methods, seasonal models and their forecasting. Transfer function models, their identification, fitting, and checking. Univariate spectral analysis; the cross correlation function and the cross spectrum; estimation of cross spectra. Prerequisite: OR 271. (Fall 1976 and alternate falls)

377 Advanced Stochastic Models in Operations Research (3)

Selected applied probability models, including Brownian motion, renewal theory, denumerable Markov chains, semi-Markov processes, and Markov decision problems. Applications to topics in advanced queuing and inventory theories, including busy periods, waiting times, imbedded Markov chains, and GI/G/1 queues; and conditions for optimality of (s, S) policies, stochastic leadtime problems, state-dependent leadtimes, and multi-echelon problems. Prerequisite: OR 277, 279; or permission of instructor. (Fall 1976 and alternate falls)

381 Reliability Theory II (3)

Nonparametric methods in reliability: increasing failure rate (IFR) and decreasing failure rate (DFR) characterizations of failure distributions, tests for IFR, DFR, and "U-shaped" distributions. Coherent structures: classes of distributions preserved under coherent structures, bounds on system reliability using modular decomposition. Drenick's theorem, preservation of monotone failure rates. Replacement: comparison of random, age, and block replacement policies. Repairman problems. Redundancy optimization and allocation of redundancy. Prerequisite: Stat 191 and permission of instructor. (Spring 1976 and alternate springs)

396 Seminar: Operations Research (arr.)

May be repeated for credit. (Fall or spring)

397 Advanced Topics in Operations Research (3)

Advanced topics from the literature of operations research for analysis, presentation, and discussion. Reading assignments from the professional journals selected by the instructor and the student. May be repeated for credit. (Fall or spring)

398 Advanced Reading and Research (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

Required Courses in Engineering Undergraduate Curricula Offered by Columbian College of Arts and Sciences

For convenience, descriptions of required courses in undergraduate curricu- which are offered by Columbian College of Arts and Sciences are listed here. See the *Undergraduate and Graduate Catalogue* for elective courses in the humanities and social sciences.

CHEMISTRY

13 General Chemistry (4)

Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Atomic structure, chemical bonding; chemical equations; acids and bases; chemical equilibrium; liquid and solid states; periodicity; electrochemistry; organic chemistry. Prerequisite: Math 31, Phys 2. Laboratory fee, $2 (Fall)

ENGLISH

***9 English Composition: Language as Communication (3)**

Intensive course in English grammar and composition for students inadequately prepared for Engl 10. Begins with detailed instruction, drill and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 10. Engl 9 meets five hours a week and carries 3 semester hours of credit. Total fee, $320.05 (tuition $282; additional fee of $25; and University Center fee, $13.05). (Fall and spring)

***10 English Composition: Language as Communication (3)**

Study and practice of expository techniques; emphasis on the rhetorical complexities of unity, development, organization, and coherence. Intensive analysis of selected current books; library research procedure. (Fall and spring)

GEOLOGY

136 Engineering Geology (3)

Geological principles and processes and their application to civil and mechanical engineering. Prerequisite: Math 31, Phys 2 or 4; or permission of instructor. (Spring)

MATHEMATICS

30 Precalculus (3)

Set theory, inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 *College Algebra* and Math 6 *Plane Trigonometry*; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent

* Students whose College Board English Composition Achievement Test scores suggest inadequate preparation may be assigned to Engl 9 or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill, before placement in either Engl 9 or 10. Students whose scores or writing skill indicate superior competence will be allowed to waive the Engl 10 requirement.

Prior to registration, new students should take a placement examination in algebra and trigonometry. (Fall and spring)

31 **Calculus of One Variable** (3)

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30* or equivalent. (Fall and spring)

32 **Calculus of Several Variables** (3)

Vectors, determinants, partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31. (Fall and spring)

PHYSICS

3 **Foundations of Physics** (3)
(Formerly General Physics)

Development of conceptual principles underlying modern physical knowledge; basics of mechanics, heat and electromagnetism, including the classical concepts of energy, momentum, heat, temperature, entropy, electric and magnetic fields, optics. Prerequisite: two years of college preparatory mathematics or concurrent registration in Math 6. (Fall and spring)

14 **Introductory Mechanics and Thermal Physics** (3)

Physical principles of mechanics and thermal physics utilizing tools of calculus. Vector calculus, equilibrium phenomena, kinematics, Newton's Laws, conservation of mass, momentum and energy, rotational motion, small vibrations, thermometry, macroscopic and microscopic properties of ideal gases, laws of thermodynamics, thermal properties of solids and liquids. Prerequisite: Phys 3 or equivalent, Math 31. Laboratory fee, $11.

15 **Elements of Electricity and Magnetism** (3)

Introductory aspects of electromagnetic theory. Static electric fields, Coulomb's Law, Gauss' Law, electric potential, capacitance and dielectrics, electric current and resistance. Ampere's Law, Faraday's Law, Maxwell's equations in integral form, electromagnetic waves. Prerequisite: Phys 3 or equivalent, Math 31. Laboratory fee, $11.

16 **Introduction to Modern Physics** (3)

Elementary approach to basic principles of quantum theory. Wave-particle duality, the hydrogen atom, Pauli's exclusion principle, X-ray spectra, the atomic nucleus, radioactivity, nuclear reactions, statistical distribution laws, applications to molecular and solid state physics. Prerequisite: Phys 14, 15, Math 32. Laboratory fee, $11.

SOCIOLOGY

126 **Urban Sociology** (3)

Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburban development. (Fall)

* Math 30 may be waived as a prerequisite by examination on scheduled dates.

GENERAL INFORMATION

Registration

THE DATES, HOURS, AND PLACE OF REGISTRATION will be stated in the *Schedule of Classes*, which is available well in advance of each semester.

A student cannot register for classes until he has received a letter of admission to the University issued by the appropriate admitting office.

No registration is accepted for less than a semester or one summer session.

A student may not register concurrently in this University and another institution without the prior permission of the dean of the college, school, or division in which he is registered in this University. Registration in more than one college, school, or division of the University requires the written permission of the deans concerned, *prior to registration*. Allowance of credit for work done concurrently at another institution is at the discretion of the appropriate committee.

ELIGIBILITY FOR REGISTRATION

Registration for the following categories of campus students is held on the days of registration stated in the University Calendar. A student who is suspended or whose record is not clear for any reason is not eligible to register.

New Student.—Upon receipt of a letter of admission, the new student is eligible for registration on the stated days of registration.

Readmitted Student.—A student previously registered in the University who was not registered for campus courses during the preceding semester or summer session must apply for and receive a letter of readmission from the appropriate admitting office before he is eligible for registration. A student registered for the spring semester of 1975 need not apply for readmission for the fall semester 1975. Such a student is a "Continuing Student."

Continuing Student.—The student registered for campus courses in the immediately preceding semester of the academic year is eligible to register upon presentation of his Registration Card from the previous semester. The student registered for the 1975 Summer Sessions campus courses, and not restricted to summer registration, is eligible to register for the 1975 fall semester on presentation of his 1975 Summer Sessions Registration card.

REGISTRATION CHANGES AND WITHDRAWALS (see pages 165–166, 170–172)

Fees and Financial Regulations

FEES PAID BY STUDENTS cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution make up the difference.

The following fees and financial regulations were adopted for the 1975 Summer Sessions and the academic year 1975-76. (See pages 163–164 for projected tuition and fee increases for 1976–79.)

Tuition Fees

For undergraduate study:

Full-time program (12 or more hours a semester)..... $1,300.00
Part-time program, for each semester hour..... 96.00

For graduate study* (except for those students registered before July 1, 1967, who wish to continue payments in accordance with the plan (see below) in effect prior to that date):

For each semester hour for which the student registers..... 96.00

Doctoral students not enrolled under the payment plan in effect before July 1, 1967, are required to register for minimum hour-loads,† as follows:

1. Full-time doctoral students must register for a minimum of 12 semester hours a semester until 24 hours of work have been completed beyond the qualifying examination; and a minimum of 4 semester hours a semester thereafter until the satisfactory completion of the final examination.
2. Part-time doctoral students must register for a minimum of 6 semester hours a semester until 24 hours of work have been completed beyond the qualifying examination; and for a minimum of 4 semester hours a semester thereafter until the satisfactory completion of the final examination.

For candidates for Master's degrees registered prior to July 1, 1967, who wish to continue payments according to the plan in effect to that date:
Total fee, including the Master's Comprehensive Examinations‡..... 2,600.00

For students registered for the degree of Doctor of Science prior to July 1, 1967, who wish to continue payments according to the plan in effect prior to that date:

---

* Registration in thesis courses (299–300) entitles the student, during such registration to the advice of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished an additional semester will be granted, requiring payment of a "continuous registration" fee (see page 163). If the preparation of the thesis extends beyond the three-semester period, approval for this extension will be required and the student must repeat the thesis course 300 and pay tuition as for a repeated course, provided the over-all time limit for earning the degree is not exceeded.

† No minimum hour-load is required during the summer sessions.

‡ Students completing payment of the total fee before completion of the required work (including thesis and comprehensive examinations) will be granted registration on a "continuous registration—no charge" basis for one semester immediately following the semester in which tuition payment is completed.

Students requiring additional time for completion of required work after completion of payment of the total fee and the expiration of a semester "continuous registration—no charge" must register each semester and pay the normal "continuous registration" fee. See page 173 for regulation governing Military Leave.

For work leading to and including the qualifying examination*	$2,600.00
For work leading to and including the final examination*	2,600.00

University Center Fee (charged all students registered on campus,† nonrefundable)

For students registered for 11 or more semester hours on campus: Each semester	46.50
For students registered for less than 11 semester hours in a semester on campus: For each semester hour for which the student registers	4.35
For students maintaining "continuous registration" status: Each semester	4.35

Additional Course Fees

In certain courses additional fees, such as laboratory and material fees, are charged. These fees are charged by the semester and, unless otherwise indicated, may be defrayed in two payments when the tuition is paid in this manner. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee the individual student will be required to pay such additional charges as are determined by the department concerned.

Graduation Fees

Bachelor's, Master's, Doctor's degrees	$25.00
Fee for Binding Master's Thesis	10.00
Fee for Microfilm Service and Printing Announcement of Final Examination for the Doctoral Degree	60.00

Residence Hall Fees (see page 180).

Special Fees

Application fee (undergraduate degree candidates) nonrefundable	10.00
Application fee (graduate degree candidates), nonrefundable	25.00

* If the tuition for the first stage is paid in full at the beginning of the first stage of the doctoral discipline, the candidate is entitled to five successive semesters on a "continuous registration—no charge" basis. If still more time is needed, the student must maintain continuous registration and pay the continuous registration fee.

If the tuition is paid in four installments at the rate of $650.00 a semester at the beginning of the first stage of the doctoral discipline, no continuous registration fee will be charged if a third year is needed for completion of the first stage of the degree requirements. If still more time is needed, the student must maintain continuous registration and pay the continuous registration fee. If the tuition is paid in six installments at the rate of $433.33 a semester and if still more time is needed, the student must maintain continuous registration and pay the continuous registration fee.

If the tuition for the second stage is paid in full at the beginning of the second stage of the doctoral discipline, the candidate is entitled to three successive semesters on a "continuous registration—no charge" basis. If still more time is needed, the student must maintain continuous registration and pay the continuous registration fee.

If the tuition is paid in two installments at the rate of $1,300.00 a semester at the beginning of the second stage of the doctoral discipline, no continuous registration fee will be charged if a second year is needed for completion of this stage of the discipline. If the tuition is paid in four installments at the rate of $650.00 a semester at the beginning of the second stage and still more time is needed, the student must maintain continuous registration and pay the continuous registration fee.

† Students in off-campus programs are charged the University Center Fee only when registered for courses on campus.

Tuition deposit, nonrefundable, charged each entering or readmitted full-time undergraduate student	$100.00
Application for room reservation, nonrefundable, charged each resident student	100.00
Admission tests (when required)	6.00–12.00
Late-registration fee, for failure to register within the designated period	15.00
Late payment fee, charged for failure to make payments when due (see "Payment of Fees," page 151)	15.00
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," page 151)	35.00
Returned check fee, charged a student whose check is improperly drafted, incomplete, returned by the bank for insufficient funds, or for any other reason	15.00
Continuous registration fee, to maintain "continuous registration" status during any semester of absence from the University or after completion of tuition requirements*—due and payable on the official days of registration	96.00
Engineers' Council fee, charged each student in the School of Engineering and Applied Science for each semester or any part thereof except the summer term	5.00
Special Columbian College of Arts and Sciences departmental examination for each course to qualify for receiving credit (advanced standing), waiver of requirement, or both	25.00
For each examination to qualify for advanced standing and for each special examination	5.00
English test for foreign students (when required)	5.00
Laboratory checkout fee, for failure to check out of chemistry laboratory by the date deadline set by the instructor†	3.00
Transcript fee, for each transcript of record	2.00
Replacement of lost or stolen picture identification card	2.00

Registration for on-campus courses in the University entitles each student to the following University privileges: (1) the services of the Student and Alumni Career Services Office; (2) the use of the University Library; (3) gymnasium privileges; (4) admission to all athletic contests, unless otherwise specified; (5) subscription to the *University Hatchet*, the student newspaper; (6) admission to University debates; (7) medical attention as described under Student Health Service. These privileges terminate when the student withdraws or is dismissed from the University.

PROJECTED TUITION AND FEE INCREASES 1976–79

In order that students and their parents may plan more realistically for a total four-year period, tuition increases for the academic years 1976–77, 1977–78, and 1978–79 have been estimated as follows:

Increase by year (full-time undergraduate students):

1976–77	$100.00
1977–78	200.00
1978–79	200.00

*Payment of the continuous registration fee entitles the student to return and continue his work toward a degree under the academic requirements which were in force at the time of his first registration. The continuous registration fee applies toward neither tuition fee nor residence requirements for the degree. (See footnotes on pages 161 and 162.)
See page 173 for regulation governing Military Leave.
†A student who drops a chemistry course before the end of the semester must check out of the laboratory at the next regular laboratory period.

* Increase by semester hour (graduate and part-time undergraduate students):

1976–77	$4.00
1977–78	7.00
1978–79	5.00

The University Center Fee will be increased for the 1976 summer session and the academic year 1976–77. For students taking 11 or more semester hours, the fee will be not more than $52.50 a semester, a maximum increase of $6. Students taking less than 11 semester hours will pay not more than $5 a semester hour, a maximum increase of $.65.

Every effort will be made to keep tuition increases within the above limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment in these estimates.

PAYMENT OF FEES

No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees for each semester are due and payable in full at the Office of the Cashier at the time of each registration. Checks and postal money orders should be made out to George Washington University.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for six semester hours or more may sign a deferred payment contract with the Student Accounts Office at the time of each registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before October 22, 1975 (for the fall semester), and March 10, 1976 (for the spring semester). Interest at the rate of eight per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $590 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late-payment fee and will be subject to the interest charge of eight per cent per annum. Accounts which become 30 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits his right to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

* Semester-hour increases become effective at the beginning of the summer sessions preceding the academic year.

PREPAID AND DEFERRED PAYMENT PLANS FOR PARENTS

Several commercial programs for parents who wish to pay for college on a monthly basis are available. Terms and conditions vary, but most provide a life insurance policy in the contract. For specific details and applications, address inquiries to the following:

1. Girard Edu-Check Plan, 2nd and Chestnut Streets, Philadelphia, Pa. 19106
2. Richard C. Knight Insured Tuition Payment Plan, 6 St. James Avenue, Boston, Mass. 02100
3. The Tuition Plan, Inc., Concord, N.H. 03301

The University's Office of Student Financial Aid does not maintain a supply of applications for these various programs, but will be happy to provide guidance to students and parents.

WITHDRAWALS AND REFUNDS*

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean of the School. Notification to an instructor is not an acceptable notice (see "Withdrawal," pages 171–72).

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters.

1. *Complete withdrawal* from the University:

Fall Semester

Withdrawal dated on or before September 5, 1975	90 per cent
Withdrawal dated September 8 to September 19, 1975	75 per cent
Withdrawal dated September 22 to October 3, 1975	50 per cent
Withdrawal dated after October 3, 1975	none

Spring Semester

Withdrawal dated on or before January 23, 1976	90 per cent
Withdrawal dated January 26 to February 6, 1976	75 per cent
Withdrawal dated February 9 to February 20, 1976	50 per cent
Withdrawal dated after February 20, 1976	none

2. For a *change in status from full-time to part-time student* or for *partial withdrawal* by a *part-time student*, the above schedule applies to the difference in charges between the original program and the adjusted program continuing in effect.
3. A student enrolled in an undergraduate full-time program who drops or adds a course and continues to be in a full-time program will have no financial adjustments of tuition made other than those involving course fees.
4. A student who is granted military leave before completing the semester will receive credits for current charges in accordance with the schedule for complete withdrawal from the University (see No. 1, above). Payments made in excess of the nonrefundable balance will be refunded to the student. The nonrefundable balance will be maintained as a deferred credit for use by the student when he returns to the University (see "Military Leave," page 173).

* Regulations concerning withdrawals and refunds for the Summer Sessions are stated in the *Summer Sessions Catalogue*.

5. Regulations governing student withdrawals as they relate to residence ha and food service charges are contained in the specific lease arrangement

In no case will tuition be refunded or reduced because of absence fro classes.

Payment applies only to the semester for which a registration charge is in curred, and in no case will this be credited to another semester.

Authorization to withdraw and certification for work done will not be give a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can mak banking arrangements in the community.

Financial Aid*

FOR UNDERGRADUATE STUDY

GEORGE WASHINGTON UNIVERSITY offers a program of financial assistance o two basic types: awards for academic achievement without reference to finan cial circumstances—honor scholarships; and scholarships, grants, loans, an employment based upon demonstrated financial need.

Honor Scholarships.—George Washington University honor scholarships o up to $1,000 for the academic year based entirely upon academic achievemen and potential without regard to financial need are restricted to incoming fresh men and are extremely limited in number.

Need-based Aid.—The University offers extensive programs of scholarship grants, loans, and employment based upon demonstrated need. The Universit participates in the National Direct Student Loan, Basic Educational Oppor tunity Grant, Supplemental Educational Opportunity Grant, and the Colleg Work-Study programs.

Applications and supporting credentials for financial aid must be filed by Feb ruary 1 (entering freshmen), March 1 (enrolled undergraduate or entering transfer students) preceding the academic year of the award for the fall seme ter; by November 1, for the spring semester; and by May 1, for the summe sessions†. A student must reapply for financial aid each year.

Complete information concerning financial assistance is contained in th pamphlet "Student Financial Aid," which is available at the Office of Studen Financial Aid, George Washington University, Washington, D.C. 20052.

SCHOLARSHIPS AND GRANTS

Scholarships are awarded for the academic year unless otherwise specified an are credited in equal parts for each semester. Each holder must carry a fu schedule of academic work during the period for which the scholarship i awarded.

The following scholarships are limited to students in the School of Enginee

* For information concerning financial aid for students from foreign countries, see page 169
† A Summer Sessions student is eligible for consideration only if he is enrolled in this Universit for at least 8 semester hours in the immediately preceding spring semester or has applied for finan cial aid for the following fall semester.

ing and Applied Science. The University offers many others which are open to engineering students.

Frederick Albert and Alma Hand Britten Scholarships (1959).—Bequest of Alma Hand Britten for scholarship assistance to students entering the School of Engineering and Applied Science who would not otherwise be able to pursue such professional study. Available for undergraduate and graduate study.

Henry Harding Carter Scholarship (1896).—Established by Maria M. Carter in memory of her husband to aid a deserving student who is preparing for the civil engineering profession. Available to students working toward the degree of Bachelor of Science (Civil Engineering).

Henry Parsons Erwin Scholarship (1955).—Established by Helen B. Erwin as a memorial to her husband, a former Trustee of the University. A partial scholarship for a student in Engineering and Applied Science.

Louis E. Giles Memorial Scholarships (1966).—Bequest of Susie E. Giles in honor and memory of her husband for scholarships to undergraduate and graduate students in the School of Engineering and Applied Science requiring financial assistance.

The George Hyman Construction Company Scholarships (1974).—Established by the George Hyman Construction Company to aid deserving students preparing for the civil engineering profession. These partial tuition undergraduate scholarships begin in the fall semester and extend for four years, provided the holder maintains a *B* average based upon a full course load leading to a degree in civil engineering and continues to be in financial need.

George Washington University Board of Trustees Scholarships.—Full- and partial-tuition undergraduate scholarships which begin in the fall semester and extend for four successive academic years, provided the holder maintains a *B* average, as well as a high standard of deportment, and continues to be in financial need. Candidates must plan to select a curriculum leading to a Bachelor's degree.

FOR GRADUATE STUDY

SCHOLARSHIPS, FELLOWSHIPS, ASSISTANTSHIPS

The George Washington University program of financial assistance for graduate students includes graduate scholarships, fellowships, assistantships, traineeships, research appointments, part-time employment, and loans. Application for admission to graduate study is a prerequisite for consideration.

Application and correspondence concerning assistantships, fellowships, traineeships, or graduate scholarships, should be sent directly to the Dean of the School, and addressed to George Washington University, Washington, D.C. 20052. Unless otherwise specified, application and supporting credentials should be submitted not later than February 1 preceding the period for which the award is made.

Frederick Albert and Alma Hand Britten Scholarships (1959).—See above.

Paul H. and Margaret M. deMaine Scholarships (1967).—Full and partial scholarships for graduate students whose research involves the use of computers. Inquiries should be made to the Director of the Computer Center of the University.

Louis E. Giles Memorial Scholarships (1966).—See above.

Phi Delta Gamma Scholarship Endowment Fund (1968).—Established by the Beta Chapter of Phi Delta Gamma, national fraternity for graduate women. For graduate women students.

Graduate Teaching Fellowships.—Available to students in master's and doctoral programs. Each teaching fellow renders a designated unit of service to the major department of instruction and receives a stipend of up to $3,000 (on a nine-month basis), plus tuition, course fees, and University Center fee.

National Science Foundation Graduate Fellowships.—Fellowships leading to graduate degrees in the mathematical, physical, medical, biological, engineering, and social sciences, and in the history and philosophy of science; providing tuition, fees, and stipends. Open to students who have been admitted to graduate status and who have completed less than one calendar year of graduate study. Applications should be made to the Fellowship Office, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

Research Assistantships in Operations Research, Gas Turbine Project, and Related Fields.—Available to graduates, and to undergraduates on the junior and senior levels, in any school of the University. Research Assistants are expected to work 20 hours a week conducting research in support of an established research program, in programming or in conducting individual research on an approved research project. Stipends range up to $7,500, depending on the status of the student and the tenure of the appointment (9–12 months). Further information and applications are available from: (1) *Operations Research*—Director, Institute for Management Science and Engineering, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052, or (2) *Gas Turbine Project*—Director, Gas Turbine Project, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052.

Research Scholar Assistantships, GWU—NASA-Langley Program.—See page 35.

Resident Assistantships (men and women).—Available to graduate students and seniors in any field of study who are interested in working with the student personnel program in University residence halls. Specific duties vary with the position, but basically consist of counseling, advising student groups, and administration. Remuneration includes full tuition and a furnished room for the academic year. All positions are part-time, and staff members are required to enroll as full-time students in degree-granting programs. Application should be completed before March 1. Further information may be obtained from the Office of the Director of Housing.

SPONSORED AWARDS FOR GRADUATE STUDY

Information regarding awards sponsored by foundations, professional and learned societies, industries, and others which may be used in support of graduate study is available at the Graduate Fellowship Information Center, 2025 H St., N.W., for students enrolled at George Washington University. Information is also available on the prestige programs such as the Rhodes, Marshall, Woodrow Wilson, Fulbright, and Rotary International, as well as many others.

As deadlines for application vary, qualified students should make inquiries well in advance of the year of planned graduate study.

LOAN FUNDS

Several loan funds are available to students in the University in accordance with the qualifications placed thereon by the donors. Two loan programs limited to students in the School of Engineering and Applied Science are available. Students should direct inquiries to and file applications with the Office of Student Financial Aid. Applications for the National Direct Student Loan should be filed no later than April 1 for the spring semester. Complete information is contained in the pamphlet "Student Financial Aid," which is available in the Office of Student Financial Aid, George Washington University, Washington, D.C. 20052.

Warren Stickler Memorial Loan Fund (1966).—A fund established by the Precision Measurements Association as a memorial to Warren Stickler is available to engineering students.

John Brewster Willis, Jr., Loan Fund in Mechanical Engineering.—Established by Mrs. William L. Lane as a memorial to her nephew, John Brewster Willis, Jr., available to Mechanical Engineering students (graduate or undergraduate) who are primarily interested in aeronautics.

A number of short-term emergency loan funds are also available at the University. Information concerning these funds is available from the Office of Student Financial Aid.

STUDENT EMPLOYMENT

The University participates in the College Work-Study Program. Inquiries should be addressed to the Office of Student Financial Aid. In addition, the Student and Alumni Career Services Office maintains a registry of both full-time and part-time positions available in the Washington Area for undergraduate and graduate students.

After registration, students may apply at the Student and Alumni Career Services Office, Woodhull House, 2033 G Street, N.W., for interviews and referrals to positions for which they are qualified.

FOREIGN STUDENTS

Undergraduate foreign students with proven financial need who have completed one semester of full-time work (15 hours) at this University with a *B* average are eligible to apply for the Board of Trustees Scholarships. Scholarships are awarded in the spring for the following academic year. See instructions for applying for undergraduate financial aid, page 166.

Limited awards for graduate teaching fellowships are the responsibility of the chairman of the department or dean of the school in which the degree is to be earned. Work as a teaching fellow requires excellent knowledge of English—both spoken and written.

Long-term loan funds for undergraduate and graduate foreign students are limited in amount and are available only to those foreign-born persons who have established resident status in the United States through the Immigration and Naturalization Service.

Students who wish to study in the United States should have available suf-

ficient funds to cover expenses for one full year before attempting to enter a college or university. The cost at this University for one academic year (September–May) is approximately $5,000. This estimate includes room and board, tuition, books, clothes, and incidental expenses; no travel, holiday, or medical expenses are included.

Prizes

Norman B. Ames Memorial Award.—Established by many friends of Professor Ames and awarded annually to a graduating senior of the School of Engineering and Applied Science who is nominated by his fellow students as having made significant contributions to the students in the School of Engineering and Applied Science and to the School and University.

Martin Mahler Prize in Materials Testing.—A one-year membership in the American Society for Testing Materials awarded to the upper division or graduate student in engineering who submits the best reports on tests in the materials laboratories course with preference given to prestressed concrete tests.

School of Engineering and Applied Science Distinguished Scholar.—An honor accorded annually by the Faculty of the School of Engineering and Applied Science to the senior who graduates with the highest scholastic standing. The student's name is engraved on a plaque displayed in Tompkins Hall of Engineering.

Sigma Tau Prize.—A medal awarded annually by Xi Chapter to the freshman in the School of Engineering and Applied Science who maintains the highest scholastic standing in the work of the entire year.

Theta Tau Activities Plaque.—A plaque awarded annually by Gamma Beta Chapter to the senior in the School of Engineering and Applied Science with the most outstanding record in activities for the entire period of his attendance.

Regulations

A STUDENT ENROLLED in the School of Engineering and Applied Science is required to conform to the following regulations.

A student who withdraws or is suspended, or is otherwise absent from the University for one semester or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be canceled. If such falsification is discovered after the student has established an academic record at the University, he may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the Faculty) for subsequent registration in the University.

ACADEMIC DISHONESTY

The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. Although all members of the com-

munity are expected to exhibit honesty and competence in their academic work, incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels.

Copies of the University policy on academic dishonesty can be obtained from the following offices: all department chairmen, all academic deans, and the Vice President for Academic Affairs.

CHANGES IN PROGRAM OF STUDY

A student may not make any changes in his approved program of studies without the approval of the Dean. Requests for change in class registration must be made on a form provided in the School Office.

During the seven days following the first day of classes of a semester, courses may be added to the student's program with the approval of the instructor, the faculty adviser, and the Dean.

Courses may be dropped by undergraduate students without academic penalty only during the fourteen days following the first day of classes, with the approval of the instructor, the student's adviser, and the Dean. Courses may be dropped by graduate students without academic penalty only within the first four weeks of a semester, with the approval of the instructor, the faculty adviser, and the Dean.

WITHDRAWAL

A student who withdraws or is otherwise absent from the University for one semester or more must apply for readmission. If readmitted, he continues his work under the requirements and regulations in force at the time of his readmission.

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean of the School. Notification to an instructor is not an acceptable notice.

Withdrawal from a course or from the University, *without academic or financial penalty*, requires the permission of the Dean of the School. Permission to withdraw from the University will not be granted to a student who does not have a clear financial record.

Withdrawal from any course without academic penalty after the fourteenth day following the first day of classes of a semester may be granted by the Dean to undergraduate students only under the following conditions: (1) exceptional circumstances make the request necessary; (2) the request is submitted on the official form for late withdrawal; (3) as of the date of request, the grades in all courses involved are *C* or better. In exceptional circumstances the Dean may authorize withdrawal for graduate students without academic penalty after the first four weeks of a semester. In all cases financial regulations governing withdrawal remain in full effect.

All charges for courses dropped without the approval of the Dean must be met by the student. Reporting the dropping of a course to an instructor does not effect its discontinuance.

CREDIT

Credit toward a degree is given only after registration for and satisfactory completion of the required work of a course or upon the granting of advanced standing. A student who takes a course as an auditor may not take the same course later for credit.

On request the Registrar will issue to undergraduate degree candidates a balance sheet showing the amount of work completed and the requirements remaining to be met for the degree.

TRANSCRIPTS OF RECORD

Official transcripts of student records are issued by the Registrar on written request of the student or former student who has a clear financial record. A fee of two dollars is charged for each transcript.

SUMMER SCHOOL CREDIT

A student who plans to attend summer school at another institution and apply credit so earned toward graduation from this University must first secure the written approval of the Dean. In no event will credit in excess of what might be earned in a similar period in this University be recognized.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until all degree requirements are satisfied. Students who have completed course registration (including the thesis) maintain continuous registration by paying the "continuous registration" fee (see page 163). By failing to register for one semester or more, the student breaks his registration and must be readmitted. The procedure for readmission to the graduate programs is the same as that for undergraduates (see page 16). A "Readmitted Student" is required to satisfy the academic requirements existing at the time of his readmission.

Students must be registered during the summer if they are taking courses, are taking required examinations, are receiving guidance on theses or dissertations, or are expecting to graduate at the end of the Summer Sessions.

GRADUATION REQUIREMENTS

To be recommended by the Faculty for graduation a student must have met the admission requirements of the School; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which he is registered; and be free from all indebtedness to the University. Registration, either for course work or on the "continuous registration" fee basis, is required for the semester or summer session immediately preceding the awarding of the degree.

Application for Graduation.—An "Application for Graduation" form must be filed and the appropriate fee paid at the time of registration for the last semester or summer session of the senior or final year. Students completing degree requirements during the Summer Sessions will be awarded diplomas (no formal convocation) September 30, *provided* they have completed all degree requirements and have applied for graduation as a part of registration for the Summer Sessions.

Attendance and Conduct.—The University reserves the right to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

THE LIBRARY

All students registered in the University have the privilege of using the University Library. Its stacks are open, and all students are welcome to browse at their leisure. The current Registration Card must be presented when books are borrowed for outside use.

The loan period for stack books is 14 days. A fine of 25 cents is charged for each day a book is overdue. Any book which circulates is subject to recall by the Library if needed for reserve or other use. Reserve books must be used in the reserve reading room when the Library is open, except that they may be withdrawn for overnight use beginning at 8:30 p.m. A fine of 50 cents is charged for each hour or fraction thereof that a reserve book is overdue. Grades of a student are withheld until his library record is clear.

All students using the University Library are expected to be familiar with its detailed regulations, available at any of the Library's service desks.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of active duty, upon presentation to his Dean of a copy of his orders and a petition for such leave. The maintenance of "continuous registration" is not required of the student on military leave; however, he must apply for readmission to the University well in advance of the semester in which he expects to return. Payments for tuition and fees which are not refunded to the student at the time he is granted military leave will be maintained as a deferred credit for his account and use upon his return to the University.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions which are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must:

1. Afford students access to education records directly related to them;
2. Offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate; and
3. Receive the student's written consent before releasing information from his or her education records to persons outside the University, except for directory information as indicated below. Personally identifiable information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency.

The University will release the following directory information upon reques address; telephone number; dates of attendance; school, college, or division enrollment; field of study; credit hours earned; degrees earned; and honors re ceived. A student who does not wish such directory information released mu file written notice to this effect in the Office of the Registrar.

University guidelines on the release of student information may be obtaine from the Office of the Registrar.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student fro the University, or from any class or classes, whenever, in the interest of th student or the University, the University Administration deems it advisable

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the righ to modify or change requirements, rules, and fees. Such regulations shall g into force whenever the proper authorities may determine.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs witho notice whenever circumstances warrant such changes.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property. A "Lost an Found" Office is located on campus in the Safety and Security Office.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 203–205) contains regulations recently approved by th University's Board of Trustees.

Consortium of Universities of the Washington Metropolitan Area, Inc.

THE UNIVERSITIES IN WASHINGTON, D.C.—American University, Catholic Uni versity of America, *George Washington University*, Georgetown University, an Howard University—are associated in a Consortium through which they co ordinate the use of their respective facilities; District of Columbia Teacher College, Gallaudet College, Mount Vernon College, and Trinity College are a sociate members of the Consortium. Students in approved programs leading t degrees in any one of these institutions have the opportunity to select from th combined offerings of all the particular courses which best meet their needs.

Participation is limited to campus degree candidates. The following, how ever, are excluded: students in Canon Law, Dentistry, Medicine, and Theology

Law students are also excluded from participation, except for candidates for the degree of Master of Laws at George Washington University and Georgetown University.

In special courses involving private instruction (as in music or art) or tutorial study, if a special fee is charged, this fee is not covered by the Consortium agreement and must be paid by the individual student to the institution administering the course. A student interested in registering for Reserve Officer Training Corps (ROTC) courses should consult the Registrar at his institution.

Students interested in taking courses at an institution other than their own should consult the program announcements of the other institutions. Consortium application forms and instructions are available from the Registrar after the student has obtained his registration packet. In order to participate in the Consortium program (1) the graduate student must obtain the approval of his adviser and should ascertain from the department of the institution where the course is taught whether or not he is eligible for the course and whether there is a space in the class, *or* (2) the undergraduate student must obtain the approval of his adviser and *must* ascertain from the department of the institution where the course is taught whether or not he is eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar. ***A student may not take courses at another institution that are available at his own.*** The student registers and pays at his own institution for all Consortium courses.

University Computer Center

THE UNIVERSITY COMPUTER CENTER is located on the first floor of Stuart Hall, 2013 G Street, N.W. The facilities of the Center are available for academic purposes to all registered students and to members of the instructional staff. The Center has as its principal mission the provision of a powerful computing system which serves the University in its educational, research, and administrative endeavors. The Center's programming staff concentrates its efforts in conducting faculty and staff seminars, consulting with users in the design and preparation of complicated programs, and carrying out computer-oriented research.

The Computer Center equipment consists of an IBM system 370 Model 145 computer with large capacity on-line disk storage, a card read/punch, a high-speed line printer, and four tape drives. A Remote Job Entry (RJE) station is also available. The principal languages available to the user are FORTRAN IV, COBOL, Programming Language One (PL/I), Assembler Language, and ALGOL. In addition, numerous utility, statistical, data manipulation, and simulation systems and special languages are available in the library of programs. Facilities are available on a first-come, first-served basis for preparation of programs and data.

Computer programming courses are offered by the School of Government and Business Administration, the Department of Statistics, and the School of Engineering and Applied Science. In addition, many other departments offer courses that utilize the computer as a research adjunct to course work.

The Computer Center is normally open 24 hours a day, seven days a week.

The Speech and Hearing Clinic

THE SPEECH AND HEARING CLINIC offers diagnostic and remedial work for chil-
dren and adults with such communication difficulties as stuttering, lisping, cle
palate speech, and cerebral-palsied speech; and with voice, articulatory, an
hearing problems. Diagnostic and remedial work is also available for person
with nonstandard language usage due to such conditions as hearing loss, brai
damage, mental retardation, and environmental factors.

Fees.—The fee for an initial evaluation is $30. Fees for additional specia
ized testing are dependent on the testing involved. The fees for individua
speech or hearing therapy range from $3.75 to $15 a session. Fees are reduce
for full-time students enrolled in the University and for persons receiving group
therapy. Fees are payable at the Office of the Cashier.

The Reading Center

THE READING CENTER offers individual diagnostic and corrective services for a
levels: primary, elementary, secondary, and adult. In addition, special reading
improvement classes are conducted for high school and college students as we
as other adults.

A complete diagnosis includes psychological tests; vision, hearing, dom
nance, and spelling tests; and various types of reading achievement and apt
tude tests. Results are interpreted, and a written report is presented in con
ference with the parents or the individual.

The special reading improvement classes for high school students, college
students, and other adults are offered throughout the year at stated intervals
Emphasis is placed on improvement of vocabulary, speed, comprehension, an
study skills. Instruction in spelling is also provided as needed. Mechanical aid
such as the tachistoscope, rate accelerator, and controlled reader are available
for increasing speed of comprehension.

Fees.—The fee for individual diagnosis is $90; for individual instruction, $9
a lesson; for semi-individual instruction, $7 a lesson; for instruction in small
groups, secondary level, $6 a lesson. Reading classes (15 two-hour sessions)
are offered for adults, $140; for full-time George Washington University stu
dents and alumni, $65. Full-time employees may contact the Center regarding
special fees. All fees are payable in advance at the Office of the Cashier.

Veterans Education

THE OFFICE OF THE REGISTRAR assists students entitled to educational benefits a
veterans, widows, or war orphans with any problems which may arise concern
ing their benefits. This Office also processes certification of enrollment and a
tendance to the Veterans Administration so that monthly allowances will b
paid.

When feasible, students entitled to benefits as veterans or war orphans shou
consult the Office of the Registrar prior to submitting application to the Veter
ans Administration. All such students should obtain the instruction sheet issue
by the Office of the Registrar, which sets forth requirements to be fulfilled b

fore certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The on-campus VA benefits counseling office is located in Rice Hall, 5th floor, and is open 8:30 a.m. to 5 p.m.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 20421.

Alumni Associations

THE GENERAL ALUMNI ASSOCIATION

THE OBJECTIVES OF THIS ASSOCIATION are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the University and who have left the University in good standing, or any person who is or has been a member of the teaching, research, or administrative staff of the University, or of the Board of Trustees of the University. Active members are those who are life members of The George Washington University General Alumni Association or the Alumni Association of any school of the University, or are current contributors to the George Washington University Fund.

All alumni are urged to keep the Alumni Office informed of changes of address or occupation and to supply information with regard to their fellow alumni. The Office is located in Alumni House, 714 21st Street, N.W., George Washington University, Washington, D.C. 20052.

THE ENGINEER ALUMNI ASSOCIATION OF THE GEORGE WASHINGTON UNIVERSITY, INC.

The Engineer Alumni Association was organized in 1936 and incorporated in 1963 to coordinate with the General Alumni Association those activities of primary interest to the engineering alumnus. The objectives of the Association are to provide the link between the graduates and Faculty of the School, to help promote the general welfare of the School of Engineering and Applied Science and of the University, to foster activities of the engineering organizations recognized by the University, and to advance the engineering profession in general.

In 1966 a board of directors, comprised of 15 elected members of the Association and the Engineers' representatives serving on the Governing Board of the General Alumni Association, was established. The membership of the board of directors was expanded in 1969 to include the Director of Alumni Relations and one representative each from the Faculty of the School and the student body. Members of the Association are elected each year, prior to the June meeting, to three-year board memberships as listed below:

Term Expiring 1975	*Term Expiring 1976*	*Term Expiring 1977*
Taft H. Broome	Matthew Flato	Pastor Farinas
Thomas W. Chappelle	Norris C. Hekimian	Robert J. Kiltie
Issa Khozeimeh	James A. Sinsabaugh	Albert K. Lee
Richard J. Pronk	Marjorie Townsend	John A. LeReche
Elmer W. Whitlock	John L. Wolfgang, Jr.	Javad Nilforoush

General Alumni Association Representatives
Douglas L. Jones
John R. Manning
Edward A. Wareham 3rd

Director of Alumni Relations
Elwood A. Smith

Faculty Representative
Galip M. Arkilic

Student Representative
George Russell

Regional Director
William H. Holt

Past President
John R. Manning

At the June meeting each year the board elects officers for its operation dur
the upcoming year. The officers for the years 1975–76 are

President.—Matthew Flato, B.E.E. 1949; 8519 Milford Avenue, Silver Spri
Md. 20910

Vice President.—Issa Khozeimeh, B.S. (E.E.) 1967, M.S. 1973; 4537 Alt
marle Street, N.W., Washington, D.C. 20016

Secretary.—Thomas W. Chappelle, M.E.A. 1965; 6166 Leesburg Pike, F
Church, Va. 22044

Treasurer.—Richard J. Pronk, B.S. in Engr. 1958; 12702 Bermuda Lane, Bo
Md. 20715

STUDENT LIFE

THE OFFICE OF THE VICE PRESIDENT FOR STUDENT AFFAIRS develops Student Life programs, policies, and procedures to complement the University's formal instruction program. These activities are implemented through the offices of the Cloyd Heck Marvin Center, Counseling Center, Dean of Students, Educational Opportunity Program, Housing, International Students, Student Activities, Student and Alumni Career Services, and Student Health Service.

STUDENT SERVICES

OFFICE OF THE DEAN OF STUDENTS

The Office of the Dean of Students provides counseling and information to the general student body, and assists in program development on campus, particularly in the residence halls. The members of the staff of the Dean of Students Office are informed on University policies and student services provided on campus, enabling them to provide referrals and answers to many questions concerning general student life. Personal letters of recommendation for students applying to graduate and professional schools can also be obtained from the Dean of Students Office. The Dean of Students works with the Adviser to International Students, the Director of the Counseling Center, the Director of the Educational Opportunity Program, and the Director of Housing in the implementation of their programs.

HOUSING

Complete information concerning the University's residence halls is available from the Director of Housing, George Washington University, Washington, D.C. 20052. Information concerning off-campus housing near the University may be obtained at this Office. The reservation of rooms in private houses must be made by students.

Admission to the University does not include a room reservation. The student will receive, with his notification of acceptance, University residence hall information, an application for residence hall space, and a declaration of intent to attend the University. The application for residence hall space must be accompanied by a $100 *nonrefundable deposit*. The housing deposit is credited

toward the first semester's room charge. Rooms are leased for the acade year, and lease payment must be made by July 15 for the fall semester.

1975–76 RESIDENCE HALL RATES PER PERSON FOR TWO SEMESTERS*

For Men:
Calhoun Hall
double room ..... $
triple room .....

For Women:
Strong Hall
single room 1,
double room .....

For Men and Women:
Crawford Hall (limited to sophomores, juniors, and seniors)—
double room 1,
Mitchell Hall—single room .....
Thurston Hall
double room, triple room, large room for four .....
suite for six .....

Graduate Men and Women Only:
Graduate Hall—apartment for two and three 1,
Madison Hall—double room .....

FOOD SERVICE

Resident freshmen and sophomores are required to participate in the food s ice plan. Freshmen must participate in the seven-day, 20 meals per week p at the rate of $740* for the academic year. Sophomores may elect either the meal plan or a five-day meal plan, 15 meals Monday through Friday, for $ for the academic year. Either plan is optional for junior, senior, and gradu students. Food service payment does not cover University intersession or va tion periods. All meal cards admit bearer to the dining room in Thurston H and the second floor contract dining room in the Cloyd Heck Marvin Cent

MUNSON HALL APARTMENTS

Munson Hall is a University-owned and operated apartment house contai 15 one-bedroom and 54 efficiency apartments. Graduate and married stude are given priority for residence until July 15 each year. Seniors and juni who have lived at least one year in University residence halls will be conside for residency after that date if space is available. All leases are for 12 mon

EDUCATIONAL OPPORTUNITY PROGRAM

The Educational Opportunity Program is designed to offer a college educati primarily to black and other minority students who are graduates of District Columbia high schools and/or other qualified District residents. It provides opportunity for a student to seek a degree in almost any field and at the s time receive academic and/or financial assistance.

* Residence Hall and food service prices subject to change.

CLOYD HECK MARVIN CENTER

The Cloyd Heck Marvin Center serves as the campus community center, providing services, conveniences, and recreational and social opportunities for students, faculty, staff, alumni, and guests. Its wide range of facilities provides the setting for a variety of programs conducted by the University Program Board; the departments of Drama, Dance, and Music; and other student and faculty organizations.

The Center Governing Board, representative of all elements of the University community, plays an important role in the day-to-day functioning of the Center. This Board works closely with the full-time staff in the development of procedures and policies which provide a framework for the Center's operation.

STUDENT HEALTH SERVICE

The Student Health Service is an outpatient clinic designed to assist students registered on campus with their health needs. This Service is located at 935 22nd Street, N.W. (in the H.B. Burns Memorial Building).

Physicians are available by appointment from 9 a.m. to 4:45 p.m., Monday through Friday. In addition, physicians are available to walk-in patients from 6 p.m. to 10 p.m., Monday through Friday, and from 9 a.m. to 12 noon on Saturday. This schedule is also maintained during the Summer Sessions, except that the evening closing hour Monday through Friday is 9 p.m.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. This arrangement is for emergency care only, and all fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. A student who is not currently enrolled or who has severed his connection with the University is ineligible for medical benefits of the Student Health Service. Any student may engage, if he so desires, physicians and nurses of his own choice, but he will be responsible for all the fees charged. The bills incurred from all services rendered outside of the Student Health Service (for example, X-ray work and referrals to specialists or other outside physicians) are the responsibility of the student. Within the Student Health Service, there will be only a few small charges for some services, such as materials for an allergy injection series, overseas immunizations, and certain other services.

Any student who intends to train for an athletic team is required to pass a thorough medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Physical Education, Health, and Recreation.

HEALTH AND ACCIDENT INSURANCE

The Student Health Service Office has arranged for and endorsed group health and accident insurance, on an elective basis, for those *full-time* students who do not have other coverage. Interested students should consult the Student Health Service Office.

COUNSELING CENTER

The Counseling Center works to enable the campus community to maximally profit from instruction by helping students overcome obstacles, anxieties, and confusions which hamper learning. Services are offered in three areas: (1) resolution of the individual's educational, vocational, personal, or social problems through short-term individual or group counseling/psychotherapy, vocational testing, or study skills remediation; (2) training graduate students, resident assistants, and paraprofessionals, as well as consulting on mental health topics; and (3) developing innovative methods to aid student growth, such as audiotaped information on undergraduate majors, counseling and therapy through written communication, and videotaped counselor skills training.

The Center also administers the Miller Analogies Test, Admissions Testing and special assessments for business and industry.

Fees.—Students may request a cost-free interview between 9 a.m. and 4:30 p.m., Monday through Friday (except Friday mornings). If the student decides to continue the services offered, a minimum fee of $30 will be charged for short-term treatment. However, if financial need is a factor, fee adjustments can be made.

The Counseling Center is located at 718 Twenty-first St., N.W.

INTERNATIONAL STUDENTS

International House, located at 2129 G St., N.W., is the campus center for students from foreign countries. It serves also as the headquarters of the International Students' Society, which seeks to promote international friendship and understanding by welcoming to its membership students from all countries, including those from the United States.

The Adviser to International Students has his office in International House and is available each day throughout the school week for consultation on immigration regulations and on any matters concerning the social and academic welfare of students from abroad.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

The Student and Alumni Career Services Office provides assistance to G.W.U. students and alumni seeking full-time, part-time, temporary, or permanent employment. All students are urged to become acquainted with the services of the Office early in their college experience.

Counseling concerning trends in employment, areas of employment, various test and examination announcements, preparation for job interviews, resume writing, and other procedures for successful job application are always available. Specific career openings; an on-campus recruitment program by business, industry, government, and school systems; volunteer opportunities; and part-time and temporary jobs for students while attending school are all part of the service. Referral and placement functions of the on-campus College Work-Study Program are handled by the Student and Alumni Career Services Office. Teacher credential files initiated by persons seeking employment in all educational fields are maintained in this Office.

An understanding and knowledgeable approach to avenues of service for those people who do not find career satisfaction in structured systems of business, government, and education is also provided in the Student and Alumni Career Services Office.

RELIGIOUS LIFE

The University recognizes the contribution that religion makes to the life of its students and encourages them to participate in the various religious organizations of their own choice. Catholic, Jewish, and Protestant bodies sponsor various groups and form a link between the University and the religious community. The advisers of the religious organizations are available for counseling.

Religious services in various traditions are provided regularly for the University community as announced.

DAVIS-HODGKINS HOUSE

The Davis-Hodgkins House is the student center of the School of Engineering and Applied Science, providing lounges, reading rooms, and student organization offices. The House provides convenient, comfortable facilities for the exchange of ideas and good fellowship.

STUDENT ACTIVITIES

The offices of the Vice President for Student Affairs, the Dean of Students, the Director of the Cloyd Heck Marvin Center, and the Director of Student Activities are responsible for all co-curricular phases of student life.

STUDENT ACTIVITIES OFFICE

The Student Activities Office assists individual students and organizations in program development, campus leadership training, and participation in special projects—both within the University community and in the community at large. This Office also serves as a central clearinghouse for development and maintenance of a master activities calendar—for registering and assisting campus organizations, for scheduling facilities (except in the Marvin Center) and events, and for informing the University community of the many activities and programs which can enrich the educational experience through a variety of weekly, monthly, and annual publications. The Student Activities Office is also responsible for coordinating a comprehensive orientation program for new students entering the University. Students interested in participating in the many social, cultural, or extracurricular phases of University life should acquaint themselves with the facilities and functions of the Student Activities Office and its staff.

UNIVERSITY COMMITTEES AND ORGANIZATIONS

The George Washington University is an active, working community where student involvement has become a motivating force in the governance of the University through the committee structure. This involvement has helped develop policies and programs beneficial not only to the student population, but to the total University community. While serving on these committees, student members are able to participate in the formulation and the application of ongoing institutional policy.

There are numerous committees on which members of the student body are able to serve. The Student Activities Office has a relatively complete file on major committees, and interested students should inquire there for further information. Additional information is also contained in the *Student Handbook*. A brief description of some of these committees follows:

Joint Committee of Faculty and Students.—This administrative committee, created in response to a resolution of the Faculty Senate, is composed of seven faculty members, seven student members, and other ex officio members. Members of this Committee are appointed by the President.

The Committee is officially charged to "facilitate all efforts to improve student-faculty relations," to "encourage student recommendations in all areas of Senate policy-formulation which affect student life," and to "recommend changes in the 'Rules and Regulations Governing the Conduct of Student Life.'" The Committee has specific advisory powers in many areas concerning student-faculty relations and the interests of the student body.

Committee on the Judicial System.—The Committee on the Judicial System is composed of three faculty members and three student members, one of whom is the Chairman of the Student Court, one a student member of the Student-Faculty Committee on Appeals, and one selected from the campus at large. The Committee on the Judicial System works closely with the Executive Secretary to the Judicial System to make sure that the various hearing bodies are efficiently, fairly, and expeditiously conducting their business.

Other committees include the following: the Committee on University Parking, the Committee on Religious Life, the Committee on Sponsored Research, the Committee on Student Publications, and the Committee on the University Bookstore.

THE STUDENT NOMINATING BOARD

This all-student board was created by the President upon the recommendation of the Joint Committee of Faculty and Students in February, 1971. The Board was established "to make appointments to all University Committees that have student members where there is no other existing means by or through organizational charter or constitution to do so."

The members of the Student Nominating Board are the President of Mortar Board; the President of Omicron Delta Kappa; a student member of the Graduate School of Arts and Sciences Advisory Council; and one representative from each of the following: Residence Hall Association, Engineers' Council, Joint Committee of Faculty and Students, Student Bar Association, and Association of Medical Students.

THE PROGRAM BOARD

The University Program Board, through its student committee structure and membership, provides a variety of cultural, social, and recreational programs on campus. As a result, students are afforded opportunities to broaden their educational experiences by developing and participating in those programs which contribute to the life of the University community.

Student membership on the Program Board is composed of four executive officers (Chairperson, Vice Chairperson, Secretary, Treasurer) elected from the general student body in the spring semester, and five committee chairpeople appointed after that election. The eight committees of the Program Board are

Advisory Council, Art Gallery Committee, Concert Committee, Film-Video Committee, Performing Arts Committee, Public Affairs Committee, Public Relations Committee, and Special Programming Committee. These students work with appointed faculty members and professional staff from the Division of Student Affairs in carrying out their many programs and activities.

THE ENGINEERS' COUNCIL

The Engineers' Council is the student governing body for the School of Engineering and Applied Science, composed of elected representatives from each level class and from the graduate student body, from each student organization in the School, and the House Manager of the Davis-Hodgkins House. The purpose of the Council is to provide liaison between the student body of the School and the Faculty, Administration, and Student Government of the University in all matters affecting the general interests and welfare of the student body, the School, or the University. The Council is maintained financially by the Engineers' Council fee paid by each student in the School, and sponsors the Engineers' Mixers and the Engineers' Ball. Council meetings are open to all students in the School.

STUDENT ORGANIZATIONS

The following is a representative list of organizations active at the University during 1974–75 of particular interest to students in the School of Engineering and Applied Science. More complete information on these and other organizations is available at the Student Activities Office.

HONOR SOCIETIES

Sigma Xi.—A national scientific honor society, the purpose of which is to encourage original investigation in science, pure and applied. Outstanding graduate students in the sciences are eligible for full membership, and undergraduates who have shown marked ability in research may be elected to associate membership.

Delta Sigma Rho-Tau Kappa Alpha.—A national forensic society.

Mortar Board.—A national society for juniors and seniors, stressing leadership, scholarship, and service.

Omicron Delta Kappa.—A national society emphasizing leadership in extracurricular activities.

Phi Eta Sigma.—A national society, established to encourage and reward high scholarship and attainment, membership in which is limited to those freshmen who attain a scholastic average of at least 3.50 or the equivalent.

Sigma Tau.—A national engineering honorary fraternity, the purpose of which is to recognize scholarship and professional attainment.

Tau Beta Pi.—A national engineering honorary fraternity, the purpose of which is to recognize distinguished scholarship and exemplary character.

INTERNATIONAL AND CULTURAL EXCHANGE ORGANIZATIONS

Caravansary International, East Asian Society, Friends of Canada, International Students' Society, Latin American Association, Organization of Arab Students, Students' Cultural Association of India, Student International Meditation Society, World Affairs Society.

PERFORMING ARTS

Art Gallery Committee of the Program Board; Concert Committee of the Pro
gram Board; Film Committee of the Program Board; George Washington Un
versity Dance Company; Performing Arts Committee of the Program Boar
University Chamber Choir; Chorus; Orchestra; University Players. A variety
programs is presented by these groups throughout the academic year.

POLITICAL ORGANIZATIONS

GW Ripon Society, GW College Young Republicans, GW Young Democrats
Young Americans for Freedom, Young Socialist Alliance, Young Socialists.

PROFESSIONAL ORGANIZATIONS

American Society of Civil Engineers (Student Chapter).
American Society of Mechanical Engineers (Student Chapter).
Institute of Electrical and Electronic Engineers (Student Chapter).
Theta Tau (Gamma Beta Chapter).—A national professional (engineering
fraternity. Membership by invitation to outstanding students who have com
pleted successfully at least the first year in the School of Engineering and Ap
plied Science.

PUBLICATIONS AND COMMUNICATIONS

The Cherry Tree (the yearbook), *GW Forum* (student-faculty journal), *Po
tomac Review* (publication of Consortium graduate students), *The Rock Cre
(literary magazine), *Student Handbook*, *This Month* (listing of major cultura
events in the Washington area), *This Week* (weekly list of scheduled events
The University Hatchet (semi-weekly newspaper), *Where to Go Guide* (sho
stores, and services in the campus area), WRGW (University radio station
676-NEWS (recorded telephone message of daily University activities).

RELIGIOUS ORGANIZATIONS

Baptist Student Union, B'nai B'rith Hillel Foundation, Christian Science Or
ganization, Divine Light Student Association, Eastern Orthodox Club, Inter
Varsity Christian Fellowship, Lutheran Student Association, Newman Founda
tion, Religious Society of Friends, Unitarian-Universalist Club, United Christi
Fellowship, Wesley Foundation.

SERVICE ORGANIZATIONS

B.C. Rides, Circle K, Ecology Action, GW Medical Aid, Project Share, S
Elizabeths Hospital Project, SERVE, Student Housing Project, Student Volu
teer Action Council.

SOCIAL FRATERNITIES

Delta Tau Delta, Kappa Sigma, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu
Sigma Phi Epsilon, Tau Kappa Epsilon.

SOCIAL SORORITIES

Delta Gamma, Kappa Alpha Theta, Kappa Kappa Gamma, Phi Sigma Sigma
A Panhellenic Council consists of representatives of all sororities at the Uni
versity.

SPECIAL INTEREST AND ADVOCATE GROUPS

Black Peoples' Union, Jewish Activist Front, Legal Aid Bureau, Peoples' Union, D.C. Public Interest Research Group (GW Chapter), Student Recruitment Committee.

SPORTS, HOBBIES, RECREATIONAL ORGANIZATIONS

Amateur Radio Club, Cheerleaders, Collegiate Bowling Club, Folkdance Club, Friends of Crew, Hockey Club, Military Collectors, Philubious Eggworte (music).

ATHLETICS

The University is a member of the National Collegiate Athletic Association and the Eastern College Athletic Conference. Its teams participate against the major universities throughout the Midwest and eastern seaboard. The intercollegiate program is comprised of basketball, baseball, soccer, tennis, golf, wrestling, rifle, crew, and cross country.

The University offers a broad program of intramural sports activities for both men and women through the Department of Human Kinetics and Leisure Studies.

MAJOR PROGRAM EVENTS

Art Exhibits.—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Lounge and in the art gallery of the Cloyd Heck Marvin Center. With the cooperation of the Curator of Art, an annual student art exhibit is presented.

Concert Series.—The Department of Music presents an artist concert series of five concerts each year.

International Programs.—The International Students' Society presents an annual International Dinner in cooperation with foreign embassies and international restaurants. Other programs include regular forums and speakers on international topics.

Orchestra and Concert Series.—The University Orchestra and Chorus are two facets of the lively arts available to students either as credit courses or as extracurricular activities. The Chorus presents major performances to the University community four or five times a year, including regular Christmas and spring concerts. The University Orchestra presents four or five concerts a year.

Program Board Series.—The University Program Board sponsors concerts each semester at which nationally known entertainers perform.

Recreation Program.—The University Recreation Association and the Department of Human Kinetics and Leisure Studies arrange a wide variety of sports and recreational activities and special events for all students.

Theatre.—The Drama Department produces seven major plays during the year on the new proscenium/thrust stage in the Dorothy Betts Marvin Theatre or in Lisner Auditorium. Several original and experimental plays are produced in the Experimental Theatre. Students have the opportunity to participate in all aspects of theatre and may receive credit toward their B.A. or M.F.A. degrees for some of their production work.

THE UNIVERSITY

HISTORY AND ORGANIZATION

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Colum-
bian College in the District of Columbia. The name of the institution wa
changed in 1873 to Columbian University and in 1904 to The George Wash-
ington University. The debt of the University to George Washington whos
name it bears is an intangible one.

George Washington, as President and as private citizen, had urgently insiste
upon the establishment of a National University in the Federal City. There by
hoped that, while being instructed in the arts and sciences, students from a
parts of the country would acquire the habits of good citizenship, throwing o
local prejudices and gaining at first hand a knowledge of the practice, as wel
as the theory, of republican government. To further the materialization of hi
hopes, Washington left a bequest of fifty shares of The Potomac Compan
"towards the endowment of a University to be established within the limits o
the District of Columbia, under the auspices of the General Government, t
that government should incline to extend a fostering hand towards it." Th
Congress never extended "a fostering hand." The Potomac Company passe
out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a gre
missionary urge and the need for a learned clergy, a group of dedicated min
isters and laymen sponsored a movement for the establishment of a college
the District of Columbia. Inspired largely by the zeal and energy of the Rev
erend Luther Rice, they raised funds for the purchase of a site and petitioned
Congress for a charter. After much delay and amendment, Congress granted
a charter which was approved by President Monroe on February 9, 1821. T
safeguard the College's nonsectarian character it provided "that persons o
every religious denomination shall be capable of being elected Trustees; no
shall any person, either as President, Professor, Tutor or pupil, be refused
admittance into said College, or denied any of the privileges, immunities, o
advantages thereof, for or on account of his sentiments in matters of religion

During the entire time when the institution was known as Columbian College
its activities were centered on College Hill, a tract of forty-six and a half acre
between the present Fourteenth and Fifteenth Streets and extending north from
Florida Avenue to somewhat beyond Columbia Road. The Medical Schoo
was located downtown. For the better part of the Columbian University period
the buildings of the University were situated along H Street between Thirteenth
and Fifteenth Streets.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. Within a few blocks are the White House, the Department of the Interior, the State Department, the World Bank, and many other government offices and international agencies. The area is not without its reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for 50 years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he hoped to see established.

The University as it is now organized consists of Columbian College of Arts and Sciences (undergraduate); the Graduate School of Arts and Sciences; the professional schools, which include the National Law Center and the schools of Medicine and Health Sciences, Engineering and Applied Science, Education, Government and Business Administration, and Public and International Affairs; the College of General Studies; the Division of University Students; the Division of Experimental Programs; and the Summer Sessions.

The George Washington University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the president is an ex officio member.

THE UNIVERSITY LIBRARIES

The Library collections of the University are housed in the University Library, the general library of the University, and in the libraries of the Institute for Sino-Soviet Studies, the National Law Center, and the School of Medicine and Health Sciences.

These collections contain approximately 632,240 volumes, to which are added some 35,000 volumes a year. Endowments, supplementing the University appropriation, provide books in the fields of American civilization, American literature, foreign service, history, public finance, and the social sciences; and gifts from many sources have enriched the collections. The Libraries currently receive 6,895 periodicals.

Information concerning the use of the Libraries may be obtained at the Library service desks.

The Library is administered for the curricular, reference, and recreational needs and interests of the students. Instruction in the use of the library is given upon request by the reference librarians. The Libraries endeavor to assist students and all members of the University to use the rich library resources of Washington and the unusual opportunities they offer for extensive research. Interlibrary loan arrangements are maintained with other libraries in the city and throughout the United States.

The student has access to the Library of Congress, the Public Library of the District of Columbia and its branches, and many of the other great special collections of the government departments. Graduate students at George Washington University may, upon application, be issued a Consortium library card which permits direct borrowing from the libraries of the other Consortium institutions.

THE BOARD OF TRUSTEES

E.K. Morris, LL.D., D.P.S., *Chairman Emeritus*

Charles E. Phillips, LL.B., LL.M., *Chairman*
*Everett H. Bellows, M.A., *Vice Chairman*
James M. Mitchell, M.A., *Secretary*
*Thaddeus A. Lindner, B.A. in Govt., *Assistant Secretary*

Robert C. Baker, LL.D.
Joel Barlow, B.A., J.D., LL.D.
George M. Bunker, B.S.
Jacob Burns, LL.B., LL.D.
George A. Butler, LL.B.
Mortimer M. Caplin, B.S., LL.B., J.S.D., LL.D.
Leon Chatelain, Jr.
Henry C. Clausen, J.D.
Jacqueline Cochran, L.H.D., LL.D., Sc.D.
Donald C. Cook, B.A., M.B.A., J.D., LL.M., L.H.D., LL.D.
*Joseph B. Danzansky, B.A., J.D.
Frank G. Dickey, M.A., Ed.D., LL.D., D.Lit., L.H.D.
Nancy B. Dudley, B.A. in Govt.
John B. Duncan, B.A., LL.B., LL.D.
Lloyd H. Elliott, M.A., Ed.D., LL.D., *President of the University*, ex officio
Katharine Graham, B.A.
Melville B. Grosvenor, B.S., Sc.D., LL.D.
Joseph H. Hirshhorn
Joseph D. Hughes, B.S., J.D., LL.M., LL.D.
L.A. Jennings
David M. Kennedy, LL.B., M.A., LL.D.
*Sidney A. Levine, B.A., M.D.
Franklin J. Lunding, LL.B., LL.D.
Jeremiah Milbank, Jr., B.A., M.B.A.
Donald W. Nyrop, B.A., LL.B.
Thornton W. Owen, B.S. in C.E., B.A.
Flaxie M. Pinkett, B.A.
*Abe Pollin, B.A. in Govt.
S. Dillon Ripley II, Ph.D., L.H.D., Sc.D.
Orville F. Rush, J.D., LL.D.
Carleton D. Smith
Charles E. Smith
Douglas R. Smith, B.S.C.
Mark Sullivan, Jr., B.A.
John W. Thompson, Jr., B.A.
*William G. White, B.S. in C.E.
John J. Wilson, LL.B.
Watson W. Wise, Ph.B.
Stephen R. Woodzell, B.S. in E.E.
James O. Wright, B.S., J.D.
*Joseph S. Wright, LL.B., LL.D.

* Alumni trustee.

HONORARY TRUSTEES

Walter M. Bastian, LL.B., LL.D.
Harry F. Duncan
Newell W. Ellison, B.A., LL.B., LL.D.
Charles C. Glover, Jr., M.A., LL.B., LL.D.
Brooks Hays, B.A., J.D., LL.D., L.H.D., D.C.L., D.D., HH.D.
Alfred H. Lawson, LL.B., LL.D.
John K. McKee
Benjamin M. McKelway, Litt.D.
E.K. Morris, LL.D., D.P.S.
Godfrey L. Munter, B.A., LL.B., LL.D.
Alexander Wetmore, Ph.D., Sc.D.
Lloyd B. Wilson

OFFICERS OF ADMINISTRATION

Lloyd Hartman Elliott, M.A., Ed.D., LL.D., *President*
Harold Frederick Bright, Ph.D., *Provost and Vice President for Academic Affairs*
Seymour Alpert, B.A., M.D., *Vice President for Development*
H. John Cantini, Jr., J.D., *Vice President for Administration*
Charles Edward Diehl, B.Arch.Engr., B.C.E., M.B.A., *Vice President and Treasurer*
James Joseph Feffer, B.A., M.D., *Vice President for Medical Affairs*
William David Johnson, B.S., *Director of Planning and Budgeting*
Louis Harkey Mayo, B.S., J.S.D., *Vice President for Policy Studies and Special Projects*
Frederick Justin Naramore, B.S., C.P.A., *Comptroller*
William Parkhurst Smith, Jr., B.A., M.B.A., M.A. in Ed., *Vice President for Student Affairs*
Robert Gebhardtsbauer, M.A., *Registrar*
Joseph Young Ruth, B.A., *Director of Admissions*

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Faculty and Staff of Instruction*

EMERITUS

Robert Emmet Cronin, *Professor Emeritus of Engineering and Applied Science*
B.S. 1925, U.S. Naval Academy; M.S. 1932, Columbia University

Benjamin Carpenter Cruickshanks, *Professor Emeritus of Mechanical Engineering*
B.S. in M.E. 1920, George Washington University

Kenneth Johnson, *Professor Emeritus of Engineering Administration*
B.A. 1931, Indiana State University; Ph.D. 1937, Purdue University

Herbert Ernest Smith, *Professor Emeritus of Engineering Administration*
B.S. 1930, C.E. 1932, City University of New York, City College; M.S. 1936, Ph.D. 1940, New York University

ACTIVE

Abd-elfattah Abd-alla, *Associate Professor of Engineering and Applied Science*
B.S. 1960, Ain Shams University, Egypt; M.S. 1963, Alexandria University; Ph.D. 1969, University of Maryland

Maurice Apstein, *Research Professor of Engineering Administration*
B.S. in E.E. 1932, City University of New York, City College; M.E.A. 1960, George Washington University; Ph.D. 1963, American University

Galip Mehmet Arkilic, *Professor of Applied Science*
B.M.E. 1946, Cornell University; M.S. 1947, Illinois Institute of Technology; Ph.D. 1954, Northwestern University

Ernest Stokes Armstrong, *Assistant Professorial Lecturer in Engineering*
B.S. 1959, M.S. 1961, Clemson University; Ph.D. 1967, North Carolina State University at Raleigh

Donald Stuart Arnstein, *Associate Professorial Lecturer in Engineering*
B.E.E. 1962, City University of New York, City College; M.S. in E.E. 1963, Massachusetts Institute of Technology; Ph.D. 1972, University of California, Los Angeles

Robert Fulton Baker, *Professorial Lecturer in Engineering*
B.C.E. 1940, Ohio State University; M.S.C.E. 1942, Purdue University

Robert Lawrence Bangert, *Professorial Lecturer in Engineering*
B.S. 1946, Carnegie-Mellon University; M.S. 1955, University of Illinois at Urbana-Champaign

Michael Benedict Barker, *Associate Professorial Lecturer in Engineering*
B.Arch, 1963, M.C.P. 1965, University of California, Berkeley

* Professors, Adjunct Professors, Associate Professors, Assistant Professors, and Instructors constitute the Faculty. The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the University Librarian are ex officio members of the Faculty.

Bruce Richard Barkstrom, *Assistant Research Professor of Engineering*
B.S. 1966, University of Illinois; M.S. 1971, Ph.D. 1972, Purdue University

Richard Walker Barnwell, *Associate Professorial Lecturer in Engineering*
B.S. 1961, M.S. 1962, Auburn University; Ph.D. 1968, Virginia Polytechnic Institute and State University

Nicholas Basdekas, *Associate Professorial Lecturer in Engineering*
B.S. 1954, M.S. 1955, C.E. 1958, Columbia University; Ph.D. 1969, Catholic University of America

Ivan Earl Beckwith, *Assistant Professorial Lecturer in Engineering*
B.S. 1948, University of Iowa

John Amos Belding, Jr., *Assistant Professorial Lecturer in Engineering*
B.S. 1965, Ph.D. 1969, University of Alabama

John William Benoit, *Associate Professorial Lecturer in Engineering*
B.S. 1952, University of Washington; M.S. 1954, North Carolina State University at Raleigh; Ph.D. 1961, Princeton University

Peter Derek Bergstrom, *Assistant Professorial Lecturer in Engineering*
B.E.E. 1960, M.S.E.E. 1963, Ph.D.E.E. 1973, Georgia Institute of Technology

John Joseph Bisaga, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1955, M.S. in E.E. 1963, Drexel University

William Thomas Bisignani, *Assistant Professorial Lecturer in Engineering*
B.S. 1961, M.S. 1962, Ph.D. 1972, Rutgers University, New Brunswick

Peter Bock, *Special Lecturer in Engineering*
B.A. 1962, Ripon College; M.S. 1964, Purdue University

Anthony Boiarski, *Assistant Professorial Lecturer in Engineering*
B.A. in A.E. 1966, M.S. in A.A.E. 1967, Ph.D. 1971, Ohio State University

Roland Lee Bowles, *Assistant Professorial Lecturer in Engineering*
B.S. 1959, Randolph-Macon College; M.S. 1961, Ph.D. 1971, University of Virginia

Daniel Philip Boyd, *Professorial Lecturer in Engineering*
B.S. in Ch.E. 1963, M.S. 1965, Ph.D. 1968, University of Maryland

Edward Howard Braun, *Associate Professor of Engineering and Applied Science*
B.A. 1948, M.A. 1950, Columbia University

Richard Still Brice, *Assistant Research Professor of Engineering*
B.S. 1959, East Texas State University; M.S. 1968, North Texas State University; Ph.D. 1973, University of Texas at Austin

Barton Brooke Bright, *Professorial Lecturer in Engineering*
B.A. 1932, American University

Ronald Max Brown, *Assistant Professorial Lecturer in Engineering*
B.S. 1958, M.S. 1960, M.A. 1964, Ph.D. 1970, Indiana University at Bloomington

Pierpont Blair Buck, *Associate Professorial Lecturer in Engineering*
B.A. 1943, Yale University; Ph.D. 1949, University of Virginia

John Dennis Buckley, *Associate Professorial Lecturer in Engineering*
B.S. 1950, St. Lawrence University; B.S. 1959, M.S. 1961, Clemson University; Ph.D. 1968, Iowa State University of Science and Technology

August Llewellyn Burgett, *Associate Professorial Lecturer in Engineering*
B.M.E. 1962, M.S.E. 1963, University of Florida; Ph.D. 1968, University of Michigan

John Paul Campbell, *Research Professor of Engineering*
B.S. 1939, Auburn University

George Chris Canavos, *Associate Professorial Lecturer in Engineering*
B.S. 1963, M.S. 1967, Ph.D. 1971, Virginia Polytechnic Institute and State University

James Edward Carter, *Assistant Professorial Lecturer in Engineering*
B.S. 1966, Ph.D. 1972, Virginia Polytechnic Institute and State University; M.S. 1968, Massachusetts Institute of Technology

William Harold Carter, *Associate Professorial Lecturer in Engineering*
B.S. in E.E. 1962, M.S. in E.E. 1963, Ph.D. 1966, University of Texas at Austin

Joseph Shih Wei Chi, *Associate Professor of Engineering and Applied Science*
B.S. 1960, Ph.D. 1965, University of London

Yishu Chiu, *Assistant Professor of Engineering*
B.E.S. 1956, Taiwan University; M.E.S. 1966, Kyoto University; Ph.D. 1972, University of Western Ontario

Brian Leonard Clarkson, *Adjunct Professor of Engineering and Applied Science*
B.S. 1951, Ph.D. 1953, University of Leeds

George Martin Coburn, *Professorial Lecturer in Law*
B.A. 1947, LL.B. 1949, Harvard University

Byron Cosby, Jr., *Professorial Lecturer in Applied Science*
B.S. 1930, Northeast Missouri State College; M.A. 1931, University of Missouri—Columbia; Ph.D. 1934, University of Chicago

Paul Arthur Crafton, *Professor of Engineering Administration*
B.M.E. 1944, City University of New York, City College; M.S. 1950, Ph.D. 1956, University of Maryland

Allen Das, *Associate Professorial Lecturer in Engineering*
B.S. 1945, M.S. 1947, Ph.D. 1962, University of London

Robert Dillon, *Professorial Lecturer in Engineering*
B.A. 1949, University of Washington; M.A. in Arch. 1952, University of Florida

Philip Donely, *Professorial Lecturer in Engineering*
B.S. 1931, Massachusetts Institute of Technology

John Edward Duberg, *Adjunct Professor of Engineering*
B.S. 1938, Manhattan College; M.S. 1940, Virginia Polytechnic Institute and State University; Ph.D. 1948, University of Illinois at Urbana–Champaign

Charles Earl Dunham, *Assistant Professorial Lecturer in Engineering*
B.S. 1963, Rochester Institute of Technology; M.S. in E.E. 1966, Ph.D. 1972, Syracuse University

John Eftis, *Professor of Engineering and Applied Science*
B.C.E. 1952, City University of New York, City College; M.S. in C.E. 1958, Columbia University; D.Sc. 1967, George Washington University

Marvin Eisenberg, *Professor of Engineering and Applied Science*
B.S. in E.E. 1953, University of Miami; M.S. in Engr. 1954, Ph.D. 1961, University of Florida

Donald Ellison, *Associate Professorial Lecturer in Engineering*
B.S. 1948, Tri-State College; M.P.A. 1951, Cornell University

William Joseph English, *Assistant Professorial Lecturer in Engineering*
B.S. 1963, St. Vincent College; B.S. in E.E. 1964, M.S. in E.E. 1965, Ph.D. 1966, Carnegie-Mellon University

Wayne Douglas Erickson, *Associate Professorial Lecturer in Engineering*
B.S. 1954, M.S. 1955, Michigan State University; M.S. 1958, D.Sc. 1962, Massachusetts Institute of Technology

Joel Ettinger, *Assistant Professorial Lecturer in Engineering*
B.C.E. 1967, City University of New York, City College; M.S. 1969, Northwestern University

James Edward Falk, *Associate Research Professor of Operations Research*
B.E.E. 1960, University of Detroit; M.S. 1961, Ph.D. 1965, University of Michigan

James Elmer Feir, *Professor of Civil Engineering; Assistant Dean of the School of Engineering and Applied Science*
B.S. 1950, University of Alberta; M.S. 1955, University of London; Ph.D. 1966, University of Cambridge

Charles Feldman, *Adjunct Professor of Engineering*
B.A. 1944, M.A. 1949, Johns Hopkins University; Ph.D. 1952, University of Paris

Anthony Vincent Fiacco, *Associate Research Professor of Operations Research*
B.A. 1950, Union College, New York; Ph.D. 1967, Northwestern University

John Bruce Fisher, *Associate Professorial Lecturer in Engineering*
B.S. 1950, St. Lawrence University

Ronald Jeffry Fisher, *Associate Professorial Lecturer in Engineering*
B.S. in C.E. 1958, Bucknell University; M.E. 1959, University of California, Berkeley

Joseph Foa, *Professor of Engineering and Applied Science*
Dr.Ing. (M.E.) 1931, Polytechnic Institute of Torino; Dr.Ing. (A.E.) 1933, University of Rome

Ernest Harvey Forman, *Visiting Assistant Professor of Operations Research*
B.S. 1964, University of Rochester; M.S. 1969, Johns Hopkins University; D.Sc. 1975, George Washington University

Raymond Richard Fox, *Professor of Engineering and Applied Science*
B.S. in C.E. 1949, M.S. in C.E. 1952, University of Washington

Robert William Fralich, *Associate Professorial Lecturer in Engineering*
B.Ae.E. 1947, University of Cincinnati; M.Ae.E. 1952, University of Virginia; Ph.D. 1963, Virginia Polytechnic Institute and State University

Alfred Martin Freudenthal, *Professor of Civil and Materials Engineering*
C.E. 1929, D.Sc. 1930, Prague Institute of Technology; M.S. 1930, Prague University

Clifford Lynn Fricke, *Associate Professorial Lecturer in Engineering*
B.S. 1947, University of Nebraska; M.S. 1956, University of Virginia; Ph.D. 1967, Virginia Polytechnic Institute and State University

Robert Earle Fulton, *Professorial Lecturer in Engineering*
B.S. 1953, Auburn University; M.S. 1958, Ph.D. 1960, University of Illinois at Urbana–Champaign

Lawrence Seymore Galowin, *Professorial Lecturer in Engineering*
B.Ae.E. 1949, M.Ae.E. 1950, Ph.D. 1956, Polytechnic Institute of Brooklyn

I. Edward Garrick, *Adjunct Professor of Engineering*
B.S. 1930, University of Chicago

Michael Paul Gaus, *Professorial Lecturer in Engineering*
B.S. 1954, M.S. 1956, Ph.D. 1959, University of Illinois at Urbana–Champaign

Charles Gilmore, *Associate Professor of Engineering and Applied Science*
B.S. 1963, M.S. 1964, Pennsylvania State University; Ph.D. 1971, University of Maryland

Ernest Glynn, *Assistant Professorial Lecturer in Engineering*
B.S. 1956, University of Maryland

Walter Anthony Goetz, *Assistant Professorial Lecturer in Engineering*
B.S. in M.E. 1960, Michigan State University; M.E.A. 1974, George Washington University

Yoram Gordon, *Adjunct Professor of Engineering*
B.S. 1953, University of California, Berkeley; M.S. 1968, Ph.D. 1970, University of Arizona

Jeffrey Archibald Gorman, *Assistant Professorial Lecturer in Engineering*
B.C.E. 1958, Cornell University; M.S. 1966, Ph.D. 1968, California Institute of Technology

Donald Gross, *Professor of Operations Research*
B.S. 1956, Carnegie-Mellon University; M.S. 1959, Ph.D. 1962, Cornell University

Walter Joseph Gunn, *Associate Professorial Lecturer in Engineering*
B.S. 1959, U.S. Merchant Marine Academy; M.S. 1967, Ph.D. 1969, University of Louisville

Max Donald Gunzberger, *Associate Professorial Lecturer in Engineering*
B.S. 1966, M.S. 1967, Ph.D. 1969, New York University

Irving Haber, *Assistant Professorial Lecturer in Engineering*
B.E.E. 1961, Cooper Union; M.S. 1965, Ph.D. 1969, Polytechnic Institute of Brooklyn

George William Haigler, *Assistant Professorial Lecturer in Engineering*
B.S. 1950, Newberry College; M.S. 1952, University of South Carolina

Andrew Lyon Haines, *Assistant Professorial Lecturer in Engineering*
B.A. 1964, Princeton University; M.A.T. 1965, Harvard University; M.S. 1968, Stanford University; D.Sc. 1973, George Washington University

John Frederick Halldane, *Professorial Lecturer in Engineering*
B.S. 1959, B.Arch. 1961, University of New Zealand; Ph.D. 1968, University of Auckland

Barry Wellesley Hannah, *Adjunct Assistant Professor of Engineering*
B.S. 1963, M.S. 1965, Ph.D. 1973, University of Cincinnati

Jay Charles Hardin, *Assistant Professorial Lecturer in Engineering*
B.S. 1964, M.A. 1965, Ph.D. 1969, Purdue University

Forest Klaire Harris, *Adjunct Professor of Engineering*
B.A. 1921, M.S. 1923, University of Oklahoma; Ph.D. 1932, Johns Hopkins University

Robert Aaron Hechtman, *Professorial Lecturer in Engineering*
B.S. in C.E. 1938, M.S. in C.E. 1939, University of Washington; Ph.D. 1948, University of Illinois at Urbana—Champaign

Robert Bernard Heller, *Professor of Engineering and Applied Science*
B.S. 1946, M.S. 1948, Ph.D. 1951, St. Louis University

Guenther Hintze, *Professorial Lecturer in Engineering*
B.S. 1927, M.S. 1929, Technological College, Breslau, Germany; Ph.D.(Hon.) 1962, New Mexico State University

John Ellis Hogge, *Assistant Professorial Lecturer in Engineering*
B.S. 1960, Randolph-Macon College; M.S. 1968, College of William and Mary

Lynn Hopewell, Jr., *Associate Professorial Lecturer in Engineering*
B.S. 1961, Virginia Polytechnic Institute and State University; M.B.A. 1968, Harvard University

Barry Martin Horowitz, *Associate Professorial Lecturer in Engineering*
B.E.E. 1965, City University of New York, City College; M.S. 1967, Ph.D. 1969, New York University

Barry Ira Hyman, *Associate Professor of Applied Science*
B.Ae.E. 1958, Rensselaer Polytechnic Institute; M.S. 1961, St. Louis University; Ph.D. 1965, Virginia Polytechnic Institute and State University

Casimir Joseph Jachimowski, *Assistant Professorial Lecturer in Engineering*
B.S. 1960, DePaul University; Ph.D. 1964, Michigan State University

Douglas Linwood Jones, *Associate Research Professor of Engineering*
B.M.E. 1963, M.S. in Engr. 1965, D.Sc. 1970, George Washington University

James Edward Just, *Associate Professorial Lecturer in Engineering*
B.S. 1968, M.S. 1969, E.E. 1970, M.B.A., Ph.D. 1973, Massachusetts Institute of Technology

*Walter Kurt Kahn, *Professor of Engineering and Applied Science*
B.E.E. 1951, Cooper Union; M.E.E. 1954, D.E.E. 1960, Polytechnic Institute of Brooklyn

John Kaye, *Professor of Engineering and Applied Science*
B.S. in M.E. 1939, M.S. in M.E. 1948, California Institute of Technology

Ram Khatri, *Assistant Professorial Lecturer in Engineering*
B.S. 1952, Agra University, India; B.E. 1956, University of Saugar, India; M.S. 1961, Lehigh University; Ph.D. 1971, University of Maryland

Khalilollah Khozeimeh, *Assistant Research Professor of Engineering*
B.C.E. 1965, M.S. 1967, D.Sc. 1974, George Washington University

*Ali Muhlis Kiper, *Associate Professor of Engineering*
M.S. in M.E. 1950, Technical University of Istanbul; M.S. in M.E. 1954, Ph.D. 1956, Purdue University

Cecil Eugene Kirby, *Assistant Professorial Lecturer in Engineering*
B.S. 1955, Clemson University; M.S. 1963, Ph.D. 1969, University of South Carolina

Joseph Kirshner, *Professorial Lecturer in Engineering*
B.S. 1947, University of Delaware; M.S. 1952, University of Maryland

Edward Charles Kollmann, *Adjunct Professor of Engineering*
B.S. 1941, Bowdoin College; M.A. 1947, Ph.D. 1950, Harvard University

* On sabbatical leave 1975–76.

Nicholas Kyriakopoulos, *Associate Professor of Engineering*
B.E.E. 1960, M.S. in Engr. 1963, D.Sc. 1968, George Washington University

George Elwood Lamphere, *Associate Professorial Lecturer in Engineering*
B.S. 1952, Haverford College; B.S. 1954, Massachusetts Institute of Technology; LL.B. 1963, George Washington University

Roger Henry Lang, *Associate Professor of Engineering and Applied Science*
B.S. in E.E. 1962, M.S. in E.E. 1964, Ph.D. 1968, Polytechnic Institute of Brooklyn

Ting Lee, *Assistant Professor of Engineering and Applied Science*
B.S. in E.E. 1962, Cheng Kung University, Taiwan; M.S. in E.E. 1965, Illinois Institute of Technology; Ph.D. 1972, University of Wisconsin—Madison

Herbert Arthur Leybold, *Associate Professorial Lecturer in Engineering*
B.C.E. 1955, Polytechnic Institute of Brooklyn; M.S. in E.M. 1963, Virginia Polytechnic Institute and State University; Ph.D. 1969, North Carolina State University at Raleigh

Harold Liebowitz, *Professor of Engineering and Applied Science; Dean of the School of Engineering and Applied Science*
B.Ae.E. 1944, M.Ae.E. 1946. D.Ae.E. 1948, Polytechnic Institute of Brooklyn

Elmer Lipsey, *Adjunct Professor of Engineering*
B.S. 1944, U.S. Coast Guard Academy; M.S. in E.E. 1958, Air Force Institute of Technology

Metin Lokmanhekim, *Associate Professorial Lecturer in Engineering*
B.S. 1951, Mersin Lycee, Turkey; M.S. 1956, Istanbul Technical University

Laurence Keith Loftin, Jr., *Professorial Lecturer in Engineering*
B.M.E. 1943, University of Virginia

William Alan MacDonald, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1967, Tri-State College; M.S. in E.E. 1970, Georgia Institute of Technology

Duncan MacKinnon, *Associate Professorial Lecturer in Engineering*
B.A.S. 1961, University of Toronto; M.S. 1964, Ph.D. 1966, Cornell University

Charles Santo Maiorana, *Associate Professorial Lecturer in Engineering*
B.S. in Engr. 1963, University of Michigan; M.S. 1967, George Washington University

William Henry Marlow, *Professor of Operations Research*
B.S. 1947, St. Ambrose College; M.S. 1948, Ph.D. 1951, University of Iowa

Joseph Durward Marsh, Jr., *Assistant Professor of Operations Research*
B.I.E. 1967, M.S. in I.E. 1969, University of Florida; Ph.D. 1973, Georgia Institute of Technology

Patrick John Martin, *Associate Professorial Lecturer in Engineering*
B.S. 1962, Iona College; M.S. 1965, D.Sc. 1972, George Washington University

Robert Dale Matulka, *Assistant Professorial Lecturer in Engineering*
B.S. 1960, U.S. Naval Academy; Ph.D. 1969, U.S. Naval Postgraduate School

Ward Douglas Maurer, *Associate Professor of Engineering and Applied Science*
B.S. 1958, University of Chicago; M.A. 1962, Ph.D. 1965, University of California, Berkeley

Otto Mayr, *Professorial Lecturer in Engineering*
M.S. 1964, University of Rochester; Dr.Rer.Nat. 1968, Technische Hochschule München

Garth Philip McCormick, *Associate Research Professor of Applied Science*
B.A. 1956, Oberlin College; M.A. 1959, University of Michigan

Thomas McGean, *Associate Professorial Lecturer in Engineering*
B.M.E. 1959, New York University; M.S. 1960, California Institute of Technology

Alvin Greene McNish, *Adjunct Professor of Engineering*
B.A. 1924, M.A. 1931, George Washington University

Arnold Charles Meltzer, *Professor of Engineering and Applied Science*
B.S. in Engr. 1958, M.S. in Engr. 1961, D.Sc. 1967, George Washington University

Richard Eugene Merwin, *Associate Professorial Lecturer in Engineering*
B.S. in E.E. 1943, Ph.D. 1965, University of Pennsylvania; M.S. in E.E. 1960, Syracuse University

Charles Molloy, *Professorial Lecturer in Engineering*
B.S. 1935, The Cooper Union; M.S. 1938, Ph.D. 1948, New York University

Raymond Clifton Montgomery, *Assistant Professorial Lecturer in Engineering*
B.S. 1963, M.S. 1964, University of Alabama; Ph.D. 1969, Virginia Polytechnic Institute and State University

Franklin David Moore, *Assistant Professorial Lecturer in Engineering*
B.S. 1961, Texas A&M University; M.S. 1963, Purdue University; Ph.D. 1966, University of Iowa

Michael Kenneth Myers, *Associate Research Professor of Applied Science*
B.A. 1962, Willamette University; B.S. 1962, M.S. 1963, Ph.D. 1966, Columbia University

Paul Joel Nahin, *Assistant Professorial Lecturer in Engineering*
B.S. 1962, Stanford University; M.S. 1963, California Institute of Technology; Ph.D. 1972, University of California, Irvine

Richard Peter Nalesnik, *Professorial Lecturer in Engineering*
B.S. 1960, M.S. 1963, Boston University; Ph.D. 1972, American University

Ahmed Khairy Noor, *Research Professor of Engineering*
B.S. 1958, Cairo University; M.S. 1961, Ph.D. 1963, University of Illinois at Urbana-Champaign

Harold Vincent Nutt, *Research Professor of Engineering*
B.S. in M.E. 1932, Iowa State University of Science and Technology; M.A. 1964, George Washington University

Michel Kazuo Ochi, *Professorial Lecturer in Engineering*
B.Eng. 1944, Osaka Imperial University; M.A. 1967, American University; D.Eng. 1957, Osaka University

Morris Solomon Ojalvo, *Professorial Lecturer in Engineering and Applied Science*
B.M.E. 1944, The Cooper Union; M.M.E. 1949, University of Delaware; Ph.D. 1962, Purdue University

Walter Olstad, *Professorial Lecturer in Engineering*
B.S. 1954, Brown University; M.S. 1958, Virginia Polytechnic Institute and State University; Ph.D. 1967, Harvard University

John Pachter, *Associate Professorial Lecturer in Engineering*
B.A. 1963, Tulane University; J.D. 1966, LL.M. 1970, George Washington University

Kent Stephen Park, *Assistant Professorial Lecturer in Engineering*
B.S. 1964, Shippensburg State College; M.S. in Applied Math. 1967, Ph.D. 1970, North Carolina State University at Raleigh

John Pasta, *Adjunct Professor of Engineering and Applied Science*
B.S. 1946, City University of New York, City College; Ph.D. 1951, New York University

Harry Perry, *Adjunct Professor of Engineering*
B.S.(C.E.) 1940, University of Pennsylvania; M.S. 1941, University of Pittsburgh

Raymond Pickholtz, *Professor of Engineering and Applied Science*
B.E.E. 1954, M.E.E. 1958, City University of New York, City College; Ph.D. 1966, Polytechnic Institute of Brooklyn

Arthur Henry Purcell, *Assistant Professorial Lecturer in Engineering*
B.S. 1966, Cornell University; M.S. 1971, Ph.D. 1972, Northwestern University

Manuel Jack Queijo, *Professorial Lecturer in Engineering*
B.S. 1944, Worcester Polytechnic Institute; M.S. 1954, University of Virginia; Ph.D. 1967, Virginia Polytechnic Institute and State University

Samuel Joseph Raff, *Professorial Lecturer in Engineering*
B.S. 1943, City University of New York, City College; M.S. 1950, Ph.D. 1957, University of Maryland

George Rappaport, *Adjunct Professor of Engineering*
B.E.E. 1941, City University of New York, City College; M.S. in E.E. 1947, Ohio State University; LL.D. 1965, Parsons College

Walter Phillip Reid, *Professorial Lecturer in Engineering*
B.S. 1938, M.S. 1939, Carnegie-Mellon University; Ph.D. 1942, University of Pittsburgh

Richard Coughlin Reynolds, *Assistant Professorial Lecturer in Engineering*
B.A. 1965, George Washington University; B.S.E.E. 1966, U.S. Naval Postgraduate School; M.S.E. 1971, University of Michigan

James Bratton Robertson, *Assistant Professorial Lecturer in Engineering*
B.S. 1956, The Citadel; B.S. 1961, M.S. 1962, Clemson University; Ph.D. 1966, Virginia Polytechnic Institute and State University

Derrill Conway Rohlfs, *Assistant Professorial Lecturer in Engineering*
B.E.E. 1955, M.S. in Engr. 1959, George Washington University

Meir Rozansky, *Lecturer in Engineering*
B.S.(M.E.) 1973, M.E.A. 1974, George Washington University

Sam Rothman, *Professor of Engineering Administration*
B.S. 1943, Long Island University; M.A. 1954, Ph.D. 1959, American University

Llewellyn Adam Rubin, *Associate Professorial Lecturer in Engineering*
B.S.(E.E.) 1955, M.S.(E.E.) 1958, University of Pennsylvania

Harry Runyan, Jr., *Associate Research Professor of Engineering*
B.E.(M.E.) 1939, Rutgers—The State University (New Brunswick); M.A.E. 1951, University of Virginia; Ph.D. 1974, Loughborough University of Technology

John Madison Russell III, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1962, Virginia Polytechnic Institute and State University; M.E.E. 1966, University of Virginia; Ph.D. 1970, University of Michigan

Gajanan Sabnis, *Associate Professorial Lecturer in Engineering*
B.S. in C.E. 1961, University of Bombay; M.Tech. 1963, Indian Institute of Technology, Bombay; Ph.D. 1967, Cornell University

Kenneth Saczalski, *Associate Professorial Lecturer in Engineering*
B.S. in M.E. 1963, University of Miami; M.S. 1967, University of Rochester; Ph.D. 1970, University of Wisconsin—Madison

John Jay Salasin, *Assistant Professorial Lecturer in Engineering*
B.S. 1964, George Washington University; M.S. 1969, Ph.D. 1972, University of Minnesota

Nils Salvesen, *Associate Professorial Lecturer in Engineering*
B.S.E. 1960, M.S.E. 1961, Ph.D. 1966, University of Michigan

Robert Bruce Samworth, *Associate Professorial Lecturer in Engineering*
B.C.E. 1959, University of Delaware; M.S. in Engr. 1962, Johns Hopkins University; Ph.D. 1968, Cornell University

John Baptist Scalzi, *Professorial Lecturer in Engineering*
B.S. 1938, Worcester Polytechnic Institute; M.S. 1940, D.Sc. 1951, Massachusetts Institute of Technology

James Schiess, *Assistant Professorial Lecturer in Engineering*
B.S. 1965, Purdue University; M.S. 1968, College of William and Mary

Harrison Hagen Schmitt, *Adjunct Professor of Engineering*
B.S. in S. 1957, California Institute of Technology; Ph.D. 1964, Harvard University

Allan Schneider, *Associate Professorial Lecturer in Engineering*
B.S.(E.E.) 1959, B.S.E.P. 1960, Lehigh University; M.S.E.E. 1962, Columbia University; Ph.D. 1974, University of Maryland

Richard Edgar Schneider, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1961, Villanova University; M.S. in E.E. 1971, Rochester Institute of Technology

Allan Richard Schrader, *Associate Research Professor of Engineering*
B.M.E. 1934, M.E. 1939, Ohio State University; M.S. in Per. Adm. 1965, George Washington University

Leonard Schuchman, *Associate Professorial Lecturer in Engineering*
B.B.A. 1957, B.E.E. 1960, City University of New York, City College; M.S. 1962, Stanford University

Fred Schulman, *Research Professor of Engineering*
B.A. 1939, City University of New York, Brooklyn College; M.S. 1948, Ph.D. 1952, Georgetown University

Jay William Schwartz, *Associate Professorial Lecturer in Engineering*
B.S. 1956, University of Pennsylvania; M.S. 1960, Ph.D. 1964, Yale University

Richard Sears, *Assistant Professorial Lecturer in Engineering*
B.M.E. 1964, M.M.E. 1968, City University of New York, City College

Presson Scott Shane, *Professor of Engineering Administration*
B.S. in Ch.E. 1941, University of Kansas; M.S. 1946, Massachusetts Institute of Technology

John Damian Shaughnessy, *Associate Professorial Lecturer in Engineering*
B.S. 1964, M.S. 1967, Virginia Polytechnic Institute and State University

Craig Conway Sherbrooke, *Associate Professorial Lecturer in Engineering*
B.S. 1956, M.S. 1960, Massachusetts Institute of Technology; Ph.D. 1969, University of California, Los Angeles

K.D. Shere, *Associate Professorial Lecturer in Engineering*
B.S. 1964, M.S. 1966, Ph.D. 1969, University of Illinois at Urbana-Champaign

John Norman Shoosmith, *Assistant Professorial Lecturer in Engineering*
B.Sc. 1959, Queen's University, Toronto; M.S. 1967, College of William and Mary; Ph.D. 1973, University of Virginia

Arnold Roy Shulman, *Associate Professorial Lecturer in Engineering*
B.E.E. 1948, New York University; M.S. in E.E. 1953, Newark College of Engineering

Robert David Shults, *Associate Professorial Lecturer in Engineering*
B.E.E. 1960, M.S. in E.E. 1963, Ph.D. 1968, Georgia Institute of Technology

*Nozer Darabsha Singpurwalla, *Professor of Operations Research*
B.S. 1959, B.V. Bhoomraddi College of Engineering and Technology, India; M.S.(I.E.) 1964, Rutgers—The State University (New Brunswick); Ph.D. 1968, New York University

Earl Franklin Skelton, *Associate Professorial Lecturer in Engineering*
B.S. 1962, Fairleigh Dickinson University; Ph.D. 1967, Rensselaer Polytechnic Institute

Nicholas Arthur Sloan, *Associate Research Professor of Engineering*
B.S. 1956, University of Maryland; M.S. 1967, D.Sc. 1971, J.D. 1974, George Washington University

George Louis Smith, *Assistant Professorial Lecturer in Engineering*
B.S. 1960, M.S. 1963, Ph.D. 1968, Virginia Polytechnic Institute and State University

Joseph Borden Smith, Jr., *Associate Professor of Engineering Administration*
B.S. in E.E. 1933, University of Florida; M.E.A. 1956, D.Sc. 1966, George Washington University

Jaroslaw Sobieszczanski, *Associate Professorial Lecturer in Engineering*
B.S. 1955, M.S. 1957, Ph.D. 1964, Technical University of Warsaw

Robert Martin Sorensen, *Adjunct Professor of Engineering*
B.S. in C.E. 1960, Newark College of Engineering; M.S. in C.E. 1962, Lehigh University; Ph.D. 1966, University of California, Berkeley

Arthur Sosslau, *Associate Professorial Lecturer in Engineering*
B.S. in C.E. 1957, Polytechnic Institute of Brooklyn

Manuel Stein, *Associate Professorial Lecturer in Engineering*
B.S. in M.E. 1943, University of Pittsburgh; M.Ae.E. 1951, University of Virginia; Ph.D. 1958, Virginia Polytechnic Institute and State University

Robert Louis Stermer, Jr., *Associate Professorial Lecturer in Engineering*
B.E.E. 1960, M.E.E. 1965, University of Virginia; Ph.D. 1971, Duke University

Terry Anthony Straeter, *Assistant Professorial Lecturer in Engineering*
B.A. 1964, William Jewell College; M.A. 1966, College of William and Mary; Ph.D. 1971, North Carolina State University at Raleigh

Calvin Thomas Swift, *Assistant Professorial Lecturer in Engineering*
B.S. 1959, Massachusetts Institute of Technology; M.S. 1965, Virginia Polytechnic Institute and State University; Ph.D. 1969, College of William and Mary

Ronald Halsey Thompson, *Associate Professorial Lecturer in Engineering*
B.A. 1950, Adelphi College; M.A. 1951, Columbia University; Ph.D. 1959, University of Pennsylvania

* On sabbatical leave 1975–76.

Robert Yen-ying Ting, *Assistant Professorial Lecturer in Engineering*
B.S. 1964, National Taiwan University; M.S. 1967, Massachusetts Institute of Technology; Ph.D. 1971, University of California at San Diego

Larry William Tombaugh, *Adjunct Professor of Engineering*
B.S. 1960, Pennsylvania State University; M.S. 1963, Colorado State University; Ph.D. 1968, University of Michigan

Theodore George Toridis, *Professor of Engineering and Applied Science*
B.S. 1954, Robert College, Turkey; M.S. 1961, Ph.D. 1964, Michigan State University

Avtar Krishan Trehan, *Adjunct Assistant Professor of Engineering*
B.S. 1962, University of Allahabad, India; M.S. 1967, Brown University; Ph.D. 1971, University of Maryland

Jerry Hassell Tucker, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1963, Mississippi State University; M.S. in E.E. 1970, University of Virginia

Harry Van Trees, *Visiting Professor of Engineering and Applied Science*
B.S. 1952, U.S. Military Academy; M.S. 1958, University of Maryland; D.Sc. 1961, Massachusetts Institute of Technology

Ernst Volgenau, *Associate Professorial Lecturer in Engineering*
B.S. 1955, U.S. Naval Academy; M.S.E.E. 1959, Air Force Institute of Technology; Ph.D. 1966, University of California, Los Angeles

John Waller, *Associate Professorial Lecturer in Engineering*
B.S. 1959, Rockhurst College; M.S. 1962, Ph.D. 1966, University of Notre Dame

Thomas Michael Walsh, *Associate Professorial Lecturer in Engineering*
B.S. in E.E. 1953, Ohio University; M.S.E. 1962, University of Akron

Karl Hugo Walther, *Professor of Engineering and Applied Science; Assistant Vice President for Academic Affairs*
B.E. 1931, M.C.E. 1933, Johns Hopkins University; Ph.D. 1967, University of Maryland

Wasyl Wasylkiwskyj, *Associate Professorial Lecturer in Engineering*
B.E.E. 1957, City University of New York, City College; M.S. in E.E. 1965, Ph.D. 1968, Polytechnic Institute of Brooklyn

Ernst Weber, *Adjunct Professor of Engineering and Applied Science*
Dipl. Engr. 1924, D.Sc. 1927, Technical University, Vienna; Ph.D. 1926, University of Vienna

Benjamin Whang, *Associate Professorial Lecturer in Engineering*
B.C.E. 1959, M.C.E. 1961, Polytechnic Institute of Brooklyn; Ph.D. 1968, Massachusetts Institute of Technology

John Lindsey Whitesides, Jr., *Associate Research Professor of Engineering*
B.S. 1965, Ph.D. 1968, University of Texas at Austin

Robert Wilson, *Professorial Lecturer in Engineering*
B.S. 1941, M.S. 1942, Georgia Institute of Technology; Ph.D. 1952, University of Texas at Austin

W. Wingate, *Associate Professorial Lecturer in Engineering*
B.S. 1964, M.S. 1965, Ph.D. 1968, Michigan State University

Alfred Abraham Wolf, *Adjunct Professor of Mechanical Engineering*
B.S. in E.E. 1948, Drexel University; M.S. in E.E. 1954, Ph.D. 1958, University of Pennsylvania

John Leonard Wolfgang, Jr., *Assistant Professorial Lecturer in Engineering*
B.E.E. 1962, M.S. in Engr. 1967, George Washington University

William Wolfgang Wolman, *Professorial Lecturer in Engineering*
B.A. 1946, City University of New York, City College; M.A. 1949, Columbia University; Ph.D. 1960, University of Rochester

John William Woods, *Assistant Professorial Lecturer in Engineering*
S.B. 1965, M.S., E.E. 1967, Ph.D. 1970, Massachusetts Institute of Technology

Michael Yachnis, *Professorial Lecturer in Engineering*
B.S. 1943, Military College, Athens; B.S. in C.E. 1951, Military Technical Training College, Athens; M.S. in Engr. 1956, M.E.A. 1962, D.Sc. 1968, George Washington University

Harold Carson Yates, Jr., *Associate Professorial Lecturer in Engineering*
B.S. 1948, M.S. 1949, North Carolina State University at Raleigh; M.S. 1953, University of Virginia; Ph.D. 1959, Virginia Polytechnic Institute and State University

Frank Levi Young, *Professorial Lecturer in Engineering*
B.S. 1950, U.S. Naval Academy; M.S.(Aero) 1958, Air Force Institute of Technology; Ph.D. 1965, University of Texas at Austin

James Chun-ying Yu, *Associate Research Professor of Engineering*
B.S. 1962, National Taiwan University; M.S. 1968, Ph.D. 1971, Syracuse University

Shao Wen Yuan, *Professor of Engineering and Applied Science*
B.S. 1936, University of Michigan; M.S. 1937, Ph.D. 1941, California Institute of Technology; Ae.E. 1939, Stanford University

Robert Mayer Zeskind, *Assistant Professorial Lecturer in Engineering*
B.S.E. 1965, Case Western Reserve University; M.S. 1968, D.Sc. 1973, George Washington University

William Edward Zorumski, *Assistant Professorial Lecturer in Engineering*
B.S. 1961, University of Missouri; M.S. 1966, University of Virginia; Ph.D. 1970, Virginia Polytechnic Institute and State University

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate* and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs† of

---

*The University Senate has been renamed the Faculty Senate.

†The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

The George Washington University as soon after order is restored as is practicably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968*:

The George Washington University is opposed to discrimination based on race, color, creed, sex, or national origin. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

---

* Amended January 18, 1973.

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.*

* The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and sho be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the College

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Educatio Government and Business Administration, Public and International Affair Office of Admissions

SCHOOL OF MEDICINE AND HEALTH SCIENCES, Admissions Office, School o Medicine and Health Sciences

SUMMER SESSIONS CATALOGUE, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL (Preregistration), FALL (Revised), AND SPRI SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

INDEX

A

Abbreviations, key to, 45
Absence, regulations concerning, *see* Attendance
Academic status, 12
Academic work load, 18–19
Accident insurance, 181
Accreditation, E.C.P.D., 12
Acoustics, graduate field and area of concentration, 34, 66
Activities, student, 183–187
Administration:
  School of Engineering and Applied Science, 42–43
  University, 191
Administration of Research and Development, graduate field and area of concentration, 137
Admission:
  For foreign students, 15–16
  To doctoral study, 27–28, 141, 153
  To Master's program, 23–24, 136–37, 140, 150
  To undergraduate study, 13–18
Advanced placement examinations, credit for, 17
Advanced standing, 17
Advisory Council, 43
Advisory system, 19
Aerospace Engineering, graduate field and area of concentration, 33, 66–67
Alumni associations, 177–78
Alumni career services, 182
Application for admission, 13, 23–24, 27–28, 162
Application for graduation, 173
Applied Mechanics, graduate field, 33
Applied Science courses, 45–46
  Graduate, 46
  Undergraduate, 45–46
Assistantships, 167–68
Athletics, 187
Attendance, 18, 26, 173
Awards, 170

B

Bachelor of Science study, 12–21, 50–56, 58–63, 104–108
Board of Trustees, 190–91

C

Calendar for 1975–76, 4–5
Career services, student and alumni, 182
Changes in program of studies, 171
Chemistry course, 158
Civil Engineering:
  Courses:
    Graduate, 78–83
    Undergraduate, 56–58
  Undergraduate study, 50–56
Civil, Mechanical, and Environmental Engineering, 50–99
  Courses:
    Graduate, 78–99
    Undergraduate, 56–58, 63–64
  Departmental staff, 50
  Graduate study, 65–78
  Undergraduate study, 50–56, 58–63
Cloyd Heck Marvin Center, 181
College Entrance Examination Board, 13, 17
College work-study program, 169
Colleges, schools, and divisions of the University, 189
Columbian College courses required for undergraduates, 158
Committees and organizations, University, 183–84
Communications:
  Graduate area of concentration, 116
  Undergraduate subject area, 105
  Student, 186
Computer Center, 175
Computer Science:
  Graduate area of concentration, 116–17
  Graduate courses, 127–32
  Undergraduate courses, 113–15
  Undergraduate option, electrical engineering field, 107–08
  Undergraduate subject area, 105

Computer-oriented Civil Engineering option, undergraduate study, 50–52, 53–54
Computer-oriented Engineering Design, graduate field and area of concentration, 67
Computer-oriented Mechanical Engineering option, undergraduate study, 58–60, 60–61
Conduct, 173
Consortium of Universities of the Washington Metropolitan Area, Inc., 24, 174–75
Construction Management, graduate field and area of concentration, 138
Continuing engineering education, 41–42
Continuing student, 160
Continuous registration, 25, 31, 163, 172
Controls and Systems, undergraduate subject area, 105
Cooperative education program in engineering, 7, 36–39
Cooperative program with Navy laboratories, 38–39
Cooperative programs, 31–42, 174–75
Counseling, 19, 182
Course numbers, explanation of, 44
Courses of instruction, 45–46, 56–58, 64, 78–99, 108–115, 118–132, 141–153–157
Credit:
  Earned in service schools, 18
  Earned through U.S. Armed Forces Institute, 18
  For advanced placement examinations, 17
  For summer work, 172
  From technical institutes, 18
  Hours, explanation of, 44
  Hours, maximum allowed, 18–19
  Toward a degree, 172
  Transfer from other institutions, 23–24, 29
Cultural and international exchange organizations, 185
Curricula, undergraduate, 22
  Civil Engineering, 51–56
  Electrical Engineering and Computer Science, 105–108
  Mechanical Engineering, 59–63

D

Davis-Hodgkins House, 183
Dean's Council, 43
Dean's Honors List, 20–21
Degree requirements, time to complete:
  Doctoral, 31
  Master's, 27
Degrees:
  Bachelor of Science, 12–22, 50–56, 58–63, 104–108
  Doctor of Science, 23, 27–31, 65–78, 115–118, 141, 153
  Master of Engineering Administration, 21–26, 23–27, 136–140
  Master of Science, 23–27, 65–78, 115–118, 140–141, 150–153
Dishonesty, regulations concerning, 170–71
Dismissal of students, 174, 203–5
Dissertation, 30
Distinction, degree earned with, 21
Doctoral program, 23, 27–31, 65–78, 115–118, 141, 153
Dormitories, 179–80
Dropping courses, 171

E

Early admission plan, 14
Educational opportunity program, 180
Electrical Engineering and Computer Science, 104–132
  Courses:
    Graduate, 118–132
    Undergraduate, 108–115
  Departmental staff, 104
  Graduate areas of concentration, 33, 116–118
  Graduate study, 115–18
  Undergraduate study, 104–108
Electronics, undergraduate subject area, 105
Electrophysics (Electronics, Fields and Waves), graduate area of concentration, 117
Emeritus faculty, 192
Employment, student, 169, 182
Energy and Power, graduate field and area of concentration, 67–68

Energy Resources and Power option, undergraduate study, 58–59, 61–62
Engineer Alumni Association, 177–178
Engineering Administration, 136–146
Courses:
Graduate, 142–146
Undergraduate, 141–142
Departmental staff, 136
Doctoral study, 141
Graduate field and area of concentration, 140–41
Graduate fields and areas of concentration, 136–39
Master's study, 136–41
Engineering Science:
Graduate courses, 93–99
Undergraduate course, 64
Engineering, study of, 8–10
Engineer's Council, 163, 185

English courses, 158
English, use of correct, 21
Environmental Civil Engineering option, undergraduate study, 54–55, 56–58
Environmental Control, graduate field and area of concentration, 68
Environmental Management, graduate field and area of concentration, 139
Examinations:
Advanced placement, 17
College Entrance Board, 13, 17
Doctoral, final, 30–31
Doctoral, qualifying, 29
For admission, 13, 14–15, 163
Graduate Record, 23
Master's Comprehensive, 25
Placement, on entrance, 22
Test of English as a foreign language, 15, 24

culty, 192–202
ligue, Fracture, and Structural Reliability, Institute for the Study of, 31–32
es, 161–163
Counseling Center, 182
Payment of, 164
Projected increases, 163–64
Reading Center, 176
Residence hall rates, 180
Speech and Hearing Clinic, 176
olarships, 167–68
ds and Waves, undergraduate subject
ea, 105
examination, doctoral, 30–31
ancial aid, 166–170
Prepaid and deferred payment plans for parents, 165

Financial regulations, 161–163
Flight Sciences, graduate field and area of concentration, 33, 69
Fluid Mechanics and Thermal Sciences, graduate field and area of concentration, 70
Food service, 180
Foreign students:
Admission, 15
Adviser to, 182
Financial aid, 169–70
International Students' Society, 182
Language test, 15, 24
Fraternities, 186
Freshman admission, 13–14

eral Alumni Association, 177
neral Operations Research, graduate
ea of concentration, 150
ology course, 158
echnics and Foundation Engineering, graduate field and area of concentration, 70–71
ds, 19–20, 26
duate Record Examination, 24

Graduate study:
Doctoral, 23, 27–31, 65–78, 115–118, 141, 153
Master's, 21–26, 23–27, 65–78, 115–118, 136–41, 150–153
Graduation fees, 162
Graduation requirements, 21, 23, 27, 30–31, 172–73
Grants, 166–67
GWU—NASA-Langley graduate program, 33–35
GWU—NSRDC graduate programs, 35–36

H

Hampton Institute, undergraduate dual degree program, 39
Health and accident insurance, 181
Health service, student, 181
History of the School, 11
History of the University, 188–89
Hobbies, organizations, 187
Honor societies, 185
Honorary Trustees, 191
Honor's list, Dean's, 20–21
Honors, special, 21
Humanities and social sciences, courses in, 22
Hydromechanics, graduate field and area of concentration, 71

I

Institute for Management Science and Engineering, 32
Institute for the Study of Fatigue, Fracture, and Structural Reliability, 31–32
Insurance, health and accident, 181
International and cultural exchange organizations, 185
International Students' Society, 182

J

Joint committee of faculty and students, 184
Judicial system, committee on, 184

L

Laboratories and Measurement, undergraduate subject area, 105
Language requirements for doctoral study, 28
Language test for foreign students, 15, 24
Leave of absence, 31; *see also* Continuous registration
Libraries, 173, 189
Loan funds, 169
Lost and found office, 174

M

Major program events, student, 187
Management Information Systems, graduate field and area of concentration, 139
Management Science, graduate area of concentration, 151
Management Science and Engineering, Institute for, 32
Marketing of Technology, graduate field and area of concentration, 139
Marvin Center, 181
Master's comprehensive examination, 25
Master's programs, 23–27, 65–78, 115–18, 136–41, 150–153
Materials Engineering, graduate field, 33; *see also* Solid Mechanics and Materials Engineering
Mathematical Modeling in Information Systems, graduate area of concentration, 151
Mathematical Optimization, graduate area of concentration, 152
Mathematics courses, 158–59
Mechanical Engineering:
  Courses:
    Graduate, 83–92
    Undergraduate, 63–64
  Graduate field, 33
  Undergraduate study, 58–63
Mechanical Engineering Design, graduate field and area of concentration, 71
Medical Engineering:
  Graduate area of concentration, 116
  Undergraduate subject area, 105
Mid-semester warning, 20
Military leave, 173
Model Building for Transportation Planning, graduate area of concentration, 152
Munson Hall apartments, 180

N

NASA-Langley graduate program, 33–35
Naval Ship Research and Development Center, graduate programs, 35–36
Navy Laboratories, cooperative program with, 38–39
Networks, undergraduate subject area, 105
Nondegree students, 44

O

Ocean, Marine, and Coastal Engineering, graduate field and area of concentration, 72
Operations Research:
Courses, 153–157
Departmental staff, 150
Doctoral study, 153
Graduate areas of concentration, 151–53
Master's study, 150–153
Operations Research in Industrial Engineering Systems, graduate area of concentration, 152
Optional Master's program without a thesis, 25
Organizations, student, 185–87

P

yment of fees, 164
erforming arts, 186
hysics courses, 159
acement examinations, advanced, 17
olicy on release of student information, 173–74
ical organizations, 186
es, 170
ation, 20
ofessional organizations, 186
Program board, 184–85
Program events, major student, 187
Programs of study and courses of instruction, 44–158
Programs, right to change, 174
Property, responsibility for, 174
Public Works Engineering, graduate field and area of concentration, 72–73
Publications, student, 186

Q

ualifying examination, doctoral, 29
uality-point index, 20
Quantitative Decision-making for Public Policy, graduate area of concentration, 152

R

ading Center, 176
admission, 16–17
admitted student, 160
creational organizations, 187
unds, 165–66
Registration, 24, 160
Regulations, 170–74, 203–5
Financial, 161–64
For Bachelor's study, 18–21
For Master's study, 25–27
Release of student information, policy on, 173–74
Religious life, 183
Religious organizations, 186
Research, doctoral, 30
Research scholar assistantships, 35
Residence halls, 179–80
Residence requirements:
For Bachelor's degree, 21
For Doctoral degree, 31
For Master's degree, 27
Risk Assessment and Assurance Technology, graduate field and area of concentration, 73
Rules, right to change, 174

S

Scholarship requirements, 19–20, 21, 26, 29
Scholarships, 167–68
Service school credit, 18
Service organizations, student, 186
Social sciences, courses in, 22
Sociology course, 159
Solid Mechanics and Materials Engineering, graduate field and area of concentration, 74
Sororities, 186
Special honors, 21
Special interest and advocate groups, student, 187
Special program, 31–42
Speech and Hearing Clinic, 176
Sports organizations, 187
Staff of instruction, 192–202
Stochastic Modeling, graduate area of concentration, 152–53
Structural Engineering, graduate field and area of concentration, 74–75
Structures and Dynamics, graduate field 33
Student activities, 183–87
Office, 183
Student career services, 182
Student health service, 181
Student information, policy on release of 173–74
Student life, 179–87
Student nominating board, 184
Student organizations, 185–87
Student services, 179–83
Summer school credit, 172
Suspension, 20, 203–5
Systems Analysis, graduate field and area of concentration, 140–41
Systems Science, Networks, and Control graduate area of concentration, 118

T

Technical institutes, credit from, 18
Technology and Public Affairs, graduate field and area of concentration, 140
Thermal Sciences, *see* Fluid Mechanics and Thermal Sciences
Thesis, 24–25
Optional Master's program without a, 25
Time of course offerings, 44
Time to complete degree requirements:
Doctoral, 31
Master's, 27
Tool requirement for doctoral study, 28
Transcripts of record, 15, 24, 28, 16 172
Transfer credit, 17–18, 24, 29
Transfer students, 15
Transportation Engineering, gradua field and area of concentration, 75
Transportation Management, gradua field and area of concentration,
Trustees, Board of, 190–91
Tuition:
Deposit, 17, 163
Fees, 161
Projected increases, 163–64

U

Undergraduate study, 12–22, 50–56, 58–63, 104–8
University Center fee, 162
Projected increase, 164
University committees and organizations, 183–84
University Computer Center, 175
University Counseling Center, 182
Urban Environmental Engineering, S uate field and area of concentra 77–78

V

Veterans Education, 176–77
Vocational counseling, 182

W

Warning, mid-semester, 20
Withdrawal, 165–66, 171–72
Work load, academic, 18–19
Work-study program, college, 169

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart.Sc.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.Forens.S.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers), Master of Science in Forensic Science (M.S. in Forens.S.), Master of Science in Special Studies (M.S. in Sp. Std.), and Doctor of Philosophy (Ph.D.).

SCHOOL OF MEDICINE AND HEALTH SCIENCES: Associate in Science (A.S.), Bachelor of Science (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Science in Medical Technology (B.S. in Med. Tech.), and Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

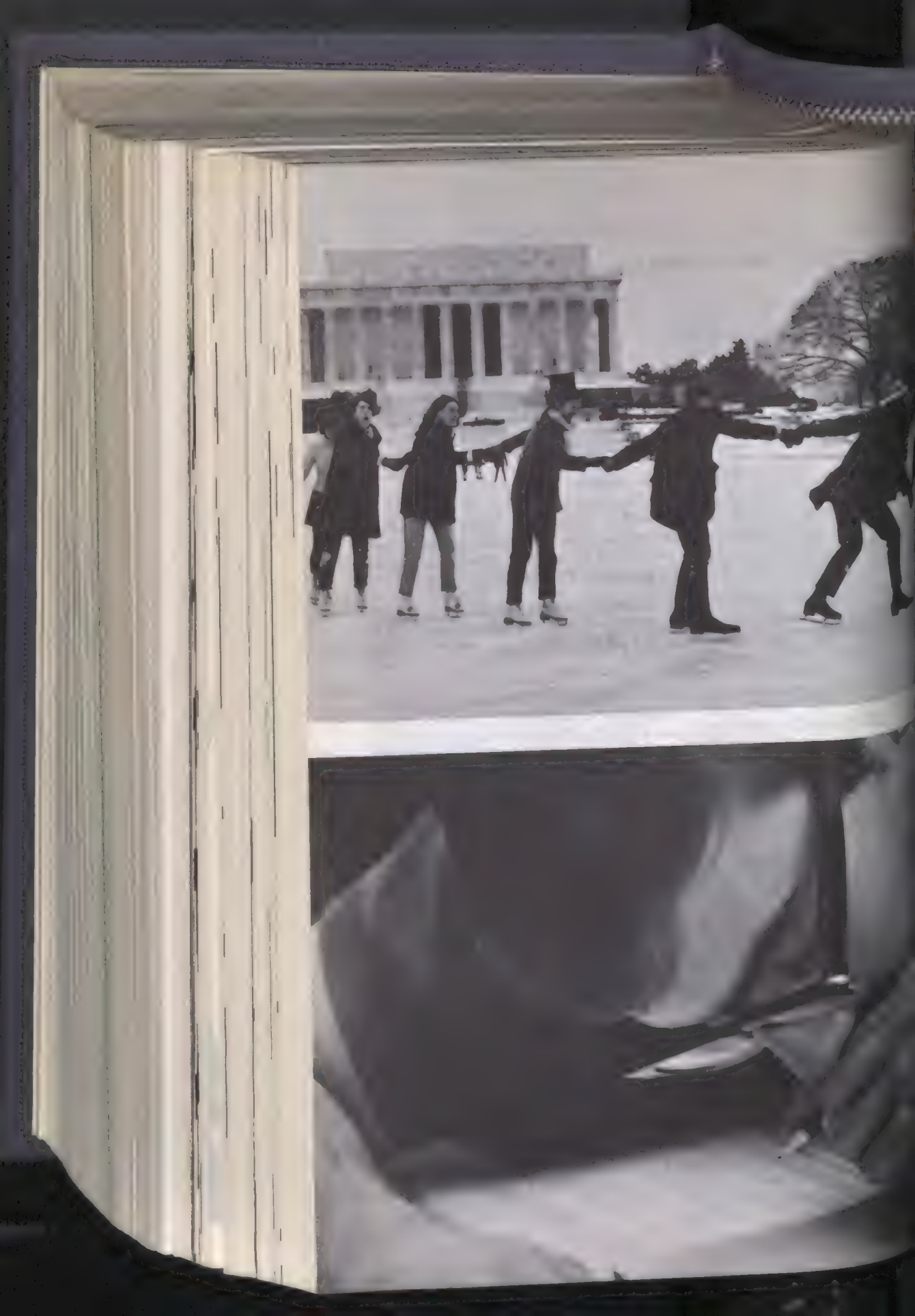
SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Engineering Administration (M.E.A.), Master of Science (M.S.), and Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor of Science in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master of Arts in Education (M.A. in Ed.), Master of Arts in Teaching (M.A.T.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A), Bachelor of Science in Administration (B.S. in Adm.), Bachelor of Science in Health Care Administration (B.S. in H.C.A.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.) and Master of Arts (M.A.), Master of Science in International Affairs (M.S.I.A.)

5/75—Cornelius—15M





FACTS ABOUT GEORGE WASHINGTON UNIVERSITY

General Information	Private, nonsectarian, coeducational, founded 1821
Location	Washington, D.C., bounded by Pennsylvania Avenue and 19th, F, and 24th Streets, N.W.
Number of Students	15,640 (9,643 men, 5,997 women)
Number of Undergraduates	5,155 (2,853 men, 2,302 women)
Geographical Origin of Students	50 states, District of Columbia, 110 countries
Number of Full-time Faculty	922 (78% with Doctoral degrees)
Number of Part-time Faculty	350 (includes some of the most distinguished men and women in Washington who serve as professorial lecturers)
Residence Hall Space	1,919

Undergraduate majors: Accounting, American Civilization, American Literature, Anthropology, Applied Mathematics, Applied Statistics, Art History, Biology, Business Administration, Cartography, Chemistry, Chinese Language and Literature, Civil Engineering, Classical Archaeology and Anthropology, Classical Archaeology, Classics, Classical Humanities, Computer Science, Dramatic Art, East Asian Studies (China and Japan), Economics, Electrical Engineering, Elementary Education, English Literature, Environmental Health, Environmental Studies, Fine Arts, French Language and Literature, Geodesy, Geography, Geology, Germanic Languages and Literatures, History, Human Kinetics and Leisure Studies, International Affairs, Journalism, Judaic Studies, Latin, Latin American Studies, Mathematical Statistics, Mathematics, Mechanical Engineering, Medical Technology, Music (Applied, History and Literature, Theory), Nurse Anesthetist Program, Nurse Practitioner Program, Oceanography, Philosophy, Physician's Assistant Program, Physics, Political Science, Premedicine, Psychology, Public Affairs, Radiologic Science and Administration, Religion, Russian Language and Literature, Russian Literature and Culture, Translation, Secondary Education, Sociology, Spanish American Literature, Spanish Language and Literature, Speech Communication, Speech, Pathology and Audiology, Urban Affairs, Zoology.

Study leading to graduate or professional degrees is offered in the Graduate School of Arts and Sciences, the National Law Center, the School of Medicine and Health Sciences, the School of Engineering and Applied Science, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.



GEORGE WASHINGTON UNIVERSITY CAMPUS / WASHINGTON, D.C.

THE GEORGE WASHINGTON UNIVERSITY

COLUMBIAN COLLEGE OF ARTS AND SCIENCES, 1821

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE AND HEALTH SCIENCES, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

THE DIVISION OF UNIVERSITY STUDENTS, 1930

THE COLLEGE OF GENERAL STUDIES, 1950

THE SUMMER SESSIONS, 1916

THE UNIVERSITY HOSPITAL, 1898

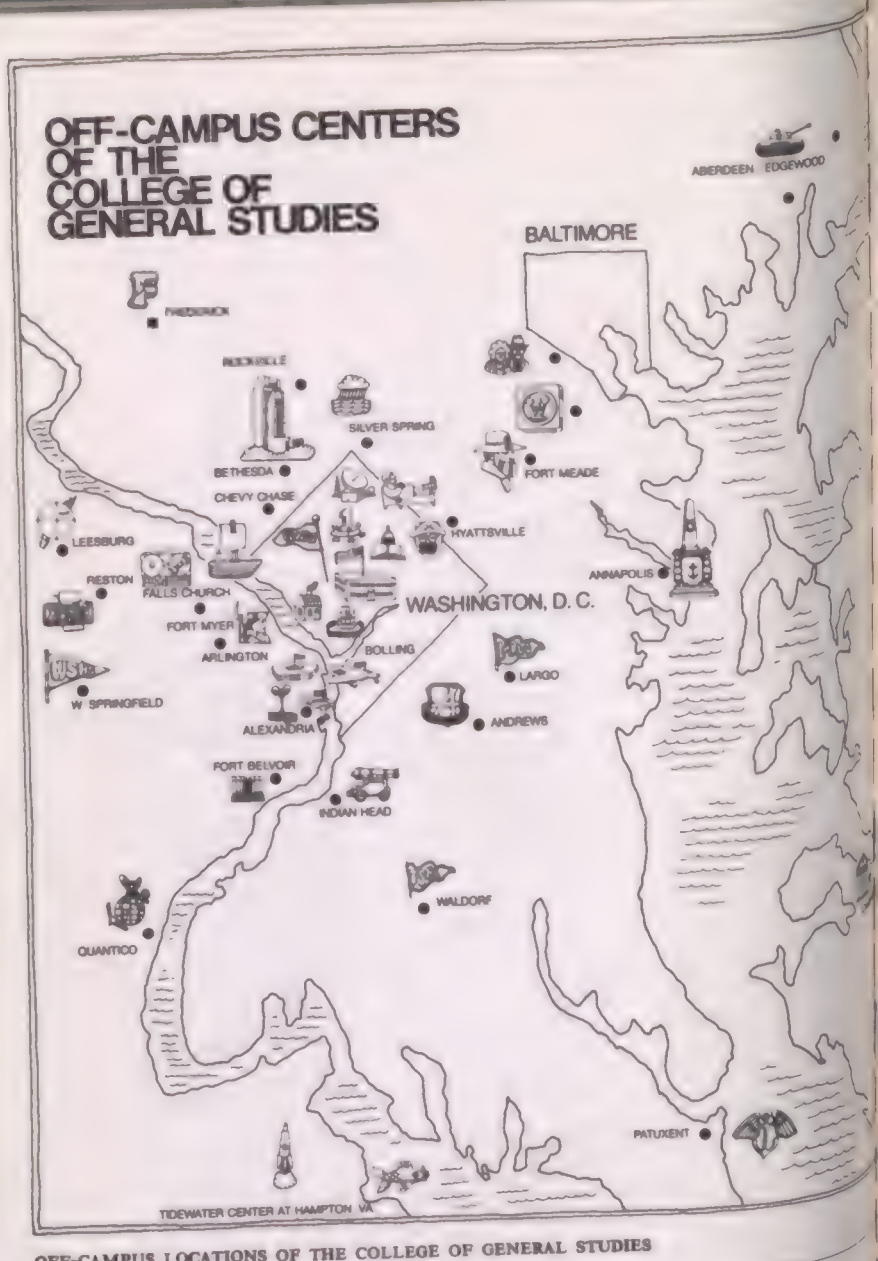
THE DIVISION OF EXPERIMENTAL PROGRAMS, 1973

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
Vol. LXXIV, No. 8, July, 1975



COLLEGE OF GENERAL STUDIES

1975-1976



OFF-CAMPUS LOCATIONS OF THE COLLEGE OF GENERAL STUDIES

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
Volume LXXIV, Number 8, July, 1975

Published by The University at Washington, D.C. 20052

MONTHLY: DECEMBER, JUNE
(2 ISSUES IN MAY, 3 ISSUES IN MARCH, JULY)

Second Class Postage Paid at Washington, D.C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN

THE COLLEGE OF GENERAL STUDIES 1975–1976

WASHINGTON, D.C. 20052

From the Dean's Desk

The College of General Studies was established as a division of the Geor Washington University on October 12, 1950. Throughout the past quarter a century the primary goal of the college has been to provide academic pr grams that meet the special requirements of the adult, part-time student in th Washington area. These have included undergraduate programs for thos without previous college work or who have credits from other colleges and want to complete a degree program; graduate programs for those preparing t move into new levels of responsibility or more specialized career fields; and nondegree work for those with a special interest in more limited areas.

George Washington University has demonstrated a concern for the adu part-time student for more than 100 years. In the late 19th century GW be came one of the first universities in the nation to schedule credit courses late afternoon and early evening. Federal employees, whose work-day ende at 3 p.m., were able to continue their education, and the University was ab to recruit part-time faculty from experienced professionals in the federal com munity.

The adult student received increasing attention in the decades followi World War II, first as a veteran attending college under the GI Bill, and la as a mid-career professional preparing to meet increasing demands in mar specialized career fields.

The College of General Studies was organized to meet the needs of suc students. A feasibility report prepared in 1949 proposed the new division extend the scholarship resources . . . the high standards of instruction an evaluation . . . and the administrative skills of the University . . . and spe cifically, to provide more adequately for the education of adult leaders."

The College today works with the academic divisions of the University staff development officers in government, business, and professional organi tions to carry out this mandate. It has developed a network of off-campu centers from northern Maryland to the Tidewater area of Virginia to make programs more accessible to the part-time student. It provides a full schedu of offerings from noncredit pre-college refresher courses to Associate's, Bach lor's, and Master's degree programs and doctoral work in selected fields. The University maintains the same standards for off-campus courses as for those given in campus classrooms.

Although much has been accomplished in the past 25 years, the College always prepared to explore new ways to bring quality educational progra to the public it is committed to serve. We hope we will be able to meet your particular needs.

Robert L. Holland
Dean
College of General Studies

CONTENTS

Page

2 Message from the Dean
4 The Calendar
7 The University
7 History
8 The Colleges, Schools, and Divisions
9 Academic Status
10 Location
10 Government
11 The General Alumni Association
12 The Board of Trustees
14 Officers of Administration
16 College of General Studies
23 Admissions
24 Registration
30 Fees and Financial Regulations
40 Regulations
47 Student Services
48 Continuing Education for Women
49 Degree Programs
49 Undergraduate Degrees
49 Associate in Arts in General Studies
50 Bachelor of General Studies
52 Bachelor of Science in Administration
55 Bachelor of Science in Geodetic and Cartographic Science
57 Bachelor of Science in Oceanography
58 Special Degree Programs
59 Graduate Degrees
59 Master of Arts
60 Master of Arts in Education
61 Education Specialist
62 Master of Arts in Special Studies and Master of Science in Special Studies
63 Master of Science in Administration
64 Master of Science
65 Master of Engineering Administration
66 Doctor of Science
67 Special Degree Programs
68 Off-campus Locations of the College of General Studies
69 Courses of Instruction
96 Appendix: Recently Established Regulations
98 Index

THE CALENDAR 1975–76*

AUGUST 1975

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SEPTEMBER 1975

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

OCTOBER 1975

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

NOVEMBER 1975

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

DECEMBER 1975

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

JANUARY 1976

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

FEBRUARY 1976

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29						

MARCH 1976

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

APRIL 1976

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

MAY 1976

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

JUNE 1976

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

JULY 1976

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

1975	**FALL SEMESTER**
August 20–September 5	Off-campus registration† (days of registration and hour ning classes will be announced in the *Off-campus Sch ule of Classes)*
	Application for February graduation due as part of istration
‡*August 28–30*	Registration on campus† *Thursday–Saturday*
	Application for February graduation due as part of istration
September 1	Labor Day (holiday) *Monday*
September 2	On-campus classes and School of Engineering and plied Science off-campus classes begin *Tuesday*
September 11	Off-campus classes begin *Thursday*
October 13	No off-campus classes *Monday*

* Off-campus courses organized at any time.

† Application for Master's Comprehensive Examinations is the student's responsibility and must made when registering for last courses required for degree.

‡ Hours of registration will be announced in the On-campus *Schedule of Classes.*

October 27	No off-campus classes *Monday*
November 18	D.Sc. Dissertations of February candidates due *Tuesday*
November 21–22	M.S. in Adm. Comprehensive Examinations *Friday–Saturday*
November 26	Thanksgiving recess begins after last class *Wednesday*
December 1	Classes resume *Monday*
December 1	School of Engineering and Applied Science Master's Theses of February candidates due in Dean's Office *Monday*
December 2	Last day of campus classes *Tuesday*
December 6	M.A. in Ed. Comprehensive Examinations *Saturday*
December 8–17	Campus examination period *Monday–Wednesday*
December 15	Last day of off-campus classes *Monday*
December 16–22	Off-campus examination period *Tuesday–Monday*
January 2	Master's Theses (other than those in the School of Engineering and Applied Science) of February candidates due *Friday*

1976 SPRING SEMESTER

January 2–14	Off-campus registration* (days of registration and beginning classes will be announced in the *Off-campus Schedule of Classes)*
	Applications for May graduation due as part of registration
†*January 15–17*	Registration on campus* *Thursday–Saturday*
	Applications for May graduation due as part of registration
January 19	On-campus classes begin *Monday*
January 19	Off-campus classes begin *Monday*
February 16	Winter Convocation (holiday) *Monday*
March 13	Spring recess begins after last class *Saturday*
March 22	Classes resume *Monday*
March 22	Application for April M.A. in Ed. Comprehensive Examinations due *Monday*
March 23	D.Sc. Dissertations of May candidates due *Tuesday*
April 9	School of Engineering and Applied Science Master's Theses of May candidates due in Dean's Office *Friday*
April 16–17	M.S. in Adm. Comprehensive Examinations *Friday–Saturday*
April 19	M.S. in Adm. Theses of May candidates due in Dean's Office *Monday*
April 23	Last day of campus classes *Friday*
April 23	Last day of off-campus classes *Friday*
April 24	M.A. in Ed. Comprehensive Examinations *Saturday*

*Application for Master's Comprehensive Examinations is the student's responsibility and must be made when registering for last courses required for degree.

†Days of registration will be announced in the On-campus *Schedule of Classes.*

April 29–May 8	Campus and off-campus examination period *Thursday–Saturday*
May 9	Commencement *Sunday*

1976 SUMMER SESSIONS

There are two six and one-half-week sessions and one thirteen-week session. Days of registration and beginning classes will be announced in the *Off-campus Schedule of Classes.*



THE UNIVERSITY

ISTORY

EORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian ..ege in the District of Columbia. The name of the institution was changed 1873 to Columbian University and in 1904 to The George Washington ..versity. The debt of the University to George Washington, whose name it ..rs, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted ..on the establishment of a National University in the Federal City. There he ..ged that, while being instructed in the arts and sciences, students from all ..ts of the country would acquire the habits of good citizenship, throwing off ..al prejudices and gaining at first hand a knowledge of the practice, as well ..the theory of republican government. To further the materialization of his ..es, Washington left a bequest of fifty shares of The Potomac Company ..ards the endowment of a University to be established within the limits of ..District of Columbia, under the auspices of the General Government, if ..government should incline to extend a fostering hand towards it." The ..gress never extended "a fostering hand." The Potomac Company passed ..of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great ..sionary urge and the need for a learned clergy, a group of dedicated min..ers and laymen sponsored a movement for the establishment of a college in ..District of Columbia. Inspired largely by the zeal and energy of the Rev..d Luther Rice, they raised funds for the purchase of a site and petitioned ..gress for a charter. After much delay and amendment, Congress granted a ..ter which was approved by President Monroe on February 9, 1821. To safe..d the College's nonsectarian character it provided "That persons of every ..ous denomination shall be capable of being elected Trustees; nor shall any ..on, either as President, Professor, Tutor or pupil, be refused admittance ..said College, or denied any of the privileges, immunities, or advantages ..reof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, ..activities were centered on College Hill, a tract of forty-six and a half acres ..een the present Fourteenth and Fifteenth Streets extending north from ..dia Avenue to somewhat beyond Columbia Road. The Medical School was ..ated downtown. For the better part of the Columbian University period, ..buildings of the University were situated along H Street between Thirteenth ..Fifteenth Streets.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom" between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area is not without its reminders of historic interest to the University. President Monroe, who signed the charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

THE COLLEGES, SCHOOLS, AND DIVISIONS

George Washington University includes twelve colleges, schools, and divisions as follows:

*Columbian College of Arts and Sciences** offers four-year programs in the arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. The College also provides prelegal and premedical programs, and pre-professional work required for admission to the School of Education and the School of Public and International Affairs. Columbian College has academic jurisdiction over the off-campus programs leading to the degrees of Associate in Arts in General Studies, Bachelor of General Studies, Bachelor of Science in Geodetic and Cartographic Science, and Bachelor of Science in Oceanography. These off-campus programs are administered by the College of General Studies.

The Graduate School of Arts and Sciences† offers advanced study and research leading to the degrees of Master of Arts, Master of Arts in Special Studies, Master of Fine Arts, Master of Forensic Sciences, Master of Music, Master of Science, Master of Science in Forensic Science, Master of Science in Special Studies, Master of Science for Teachers, and Doctor of Philosophy. The degrees of Master of Arts in Special Studies and Master of Science in Special Studies are also available through off-campus programs administered by the College of General Studies.

*The School of Medicine and Health Sciences**† offers work leading to the degrees of Associate in Science, Bachelor of Science, and Doctor of Medicine.

The National Law Center‡ offers courses leading to the degrees of Juris Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (American Practice), and Doctor of Juridical Science; and special programs in Continuing Legal Education.

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: Civil Engineering, Electrical Engineering, and Mechanical Engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science. The School has academic jurisdiction over the off-cam-

---

* Columbian College of Arts and Sciences cooperates with the School of Medicine and Health Sciences in offering a program leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.

† The Graduate School of Arts and Sciences cooperates with the School of Medicine and Health Sciences in offering a program leading to the combined degrees of Master of Science and Doctor of Medicine and a dual program leading to the degrees of Doctor of Medicine and Doctor of Philosophy.

‡ The National Law Center cooperates with the School of Public and International Affairs in offering a program leading to the combined degrees of Juris Doctor and Master of Arts.

ograms leading to the degrees of Master of Science, Master of Engineering dministration, and Doctor of Science. These off-campus programs are admin-ered by the College of General Studies.

The School of Education offers undergraduate programs leading to the de-ees of Bachelor of Arts in Education and Bachelor of Science in Human Ki-ics and Leisure Studies; graduate studies leading to the degrees of Master of ts in Education, Master of Arts in Teaching, Education Specialist, and Doc-of Education. The degree of Master of Arts in Education is also available ough off-campus programs administered by the College of General Studies.

The School of Government and Business Administration offers undergradu-programs leading to the degrees of Bachelor of Business Administration and chelor of Science in Health Care Administration; graduate programs leading the degrees of Master of Arts in Government, Master of Arts in Health Care dministration, Master of Business Administration, Master of Public Admin-stration, Master of Urban and Regional Planning; the Post-Master's Graduate rtificate in Health Care Administration; the degrees of Doctor of Business dministration and Doctor of Public Administration. The School also has cademic jurisdiction over off-campus programs leading to the degrees of chelor of Science in Administration and Master of Science in Administra-dies. These off-campus programs are administered by the College of General dies.

*The School of Public and International Affairs** offers undergraduate pro-ms leading to the degree of Bachelor of Arts and graduate programs leading the degree of Master of Arts. The School also offers an off-campus pro-leading to the degree of Master of Science in International Affairs.

The College of General Studies supplements the adult education program of University through campus and off-campus study; conferences, seminars, special projects; and continuing education and noncredit programs. This lege also administers the off-campus programs over which Columbian Col-of Arts and Sciences, the Graduate School of Arts and Sciences, the of Engineering and Applied Science, the School of Education, and the of Government and Business Administration have academic jurisdiction.

The Division of University Students makes available courses for students not didates for degrees in this University.

The Division of Experimental Programs.

The Summer Sessions.

DEMIC STATUS

lege Washington University is accredited by its regional accrediting agency, Middle States Association of Colleges and Secondary Schools.

e University is on the approved list of the American Association of Uni-Women and is a member of the College Entrance Examination Board.

e School of Education is a charter member of the American Association lleges for Teacher Education and is accredited by the National Council Accreditation of Teacher Education for its Bachelor's and Master's degree grams.

e School of Government and Business Administration has maintained full mbership in the Middle Atlantic Association of Colleges of Business Admin-

* National Law Center cooperates with the School of Public and International Affairs in ering a program leading to the combined degrees of Juris Doctor and Master of Arts.

istration since 1961. It joined the Council on Graduate Education for P... Administration in 1966. In 1968, the School became a member of the Amer... can Assembly of Collegiate Schools of Business. The programs in Public ... counting designed to prepare students for Certified Public Accountants exam... tions have been approved by the state boards of New York and of Maryla... The program in Hospital Administration is accredited by the National Accre... ing Commission on Graduate Education for Hospital Administration. The D... partment of Chemistry is on the approved list of the American Chemi... Society. The graduate program in clinical psychology in the Department ... Psychology is on the approved list of the American Psychological Associat... The program in speech pathology and audiology is accredited by the Educ... and Training Board of the American Boards of Examiners in Speech Pathology and Audiology.

LOCATION

The University is in downtown Washington, between Pennsylvania Avenue ... 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the Wh... House, the World Bank, the United States Information Agency, the Corcor... Gallery of Art, the Department of State, the Department of the Interior, T... General Services Administration, the National Academy of Sciences, and t... John F. Kennedy Center for the Performing Arts.

GOVERNMENT

The University is privately endowed and is governed by a self-perpetu... Board of Trustees, with the President of the University as an ex officio mem... The members of the Board are named for a period of three years and ... divided into three classes. The members of one class are elected at each ... meeting to fill the places of the members whose terms of office expire. ... members of each class are nominated by the Alumni Association.

THE GENERAL ALUMNI ASSOCIATION

The objectives of this Association are to unite the graduates who wish to ass... ciate themselves for charitable, educational, literary, and scientific purpo... and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the ... versity and who have left the University in good standing, or any person ... is or has been a member of the teaching, research, or administrative ... of the University, or of the Board of Trustees of the University. Active ... bers are those who are life members of the George Washington University ... eral Alumni Association or the Alumni Association of any school of the ... versity, or are current contributors to the George Washington University Fu...

The Alumni Office is located in Alumni House, 714 21st Street, N.W., Wa... ington, D.C. 20052.

All alumni are urged to keep the Alumni Office informed of changes of ... dress or occupation and to supply information with regard to their fellow s...

THE BOARD OF TRUSTEES

E.K. Morris, LL.D., D.P.S., *Chairman Emeritus*

Charles E. Phillips, LL.B., LL.M., *Chairman*
Everett H. Bellows, M.A., *Vice Chairman*
James M. Mitchell, M.A., *Secretary*
Thaddeus A. Lindner, B.A. in Govt., *Assistant Secretary*

Robert C. Baker, LL.D.
Joel Barlow, B.A., J.D., LL.D.
George M. Bunker, B.S.
Jacob Burns, LL.B., LL.D.
Mortimer M. Caplin B.S., LL.B., J.S.D., LL.D.
Leon Chatelain, Jr.
Henry C. Clausen, J.D.
Jacqueline Cochran, L.H.D., LL.D., Sc.D.
Donald C. Cook, B.A., M.B.A., J.D., LL.M., L.H.D., LL.D.
Joseph B. Danzansky, B.A., J.D.
Frank G. Dickey, M.A., Ed.D., LL.D., D.Lit., L.H.D.
Nancy B. Dudley, B.A. in Govt.
John B. Duncan, B.A., LL.B., LL.D.
Lloyd H. Elliott, M.A., Ed.D., LL.D., *President of the University*, ex officio
Katharine Graham, B.A.
Melville B. Grosvenor, B.S., Sc.D., LL.D.
Edwin K. Hoffman, B.S.
Joseph D. Hughes, B.S., J.D., LL.M., LL.D.
A. Jennings
David M. Kennedy, LL.B., B.A., LL.D.
Melvin R. Laird, B.A., L.H.D., D.Pol.S., LL.D.
Sidney A. Levine, B.A., M.D.
Franklin J. Lunding, LL.B., LL.D.
Jeremiah Milbank, Jr., B.A., M.B.A.
Thornton W. Owen, B.S. in C.E., B.A.
Katie M. Pinkett, B.A.
Joe Pollin, B.A. in Govt.
C. Dillon Ripley II, Ph.D., L.H.D., Sc.D.
Neville F. Rush, J.D., LL.D.
Marleton D. Smith
Charles E. Smith
Douglas R. Smith, B.S.C.
Jack Sullivan, Jr., B.A.
Ann W. Thompson, Jr., B.A.
William G. White, B.S. in C.E.
Ann A. Wilkinson, B.S., J.D.
Ann J. Wilson, LL.B.
Stephen R. Woodzell, B.S. in E.E.

---

trustee.

James O. Wright, B.S., J.D.
*Joseph S. Wright, LL.B., LL.D.

HONORARY TRUSTEES

George A. Butler, LL.B.
Harry F. Duncan
Newell W. Ellison, B.A., LL.B., LL.D.
Charles C. Glover, Jr., M.A., LL.B., LL.D.
Brooks Hays, B.A., J.D., LL.D., L.H.D., D.C.L., D.D., HH.D.
Joseph H. Hirshhorn
Alfred H. Lawson, LL.B., LL.D.
John K. McKee
Benjamin M. McKelway, Litt.D.
E.K. Morris, LL.D., D.P.S.
Godfrey L. Munter, B.A., LL.B., LL.D.
Alexander Wetmore, Ph.D., Sc.D.
Lloyd B. Wilson
Watson W. Wise, Ph.B.

OFFICERS OF ADMINISTRATION

THE UNIVERSITY

Lloyd Hartman Elliott, M.A., Ed.D., LL.D., *President*
Harold Frederick Bright, Ph.D., *Provost and Vice President for Academic Affairs*
Seymour Alpert, B.A., M.D., *Vice President for Development*
H. John Cantini, Jr., J.D., *Vice President for Administration*
Charles Edward Diehl, B.Arch.Engr., B.C.E., M.B.A., *Vice President and Treasurer*
Ronald Paul Kaufman, B.S., M.D., *Acting Vice President for Medical Affairs*
William David Johnson, B.S., *Director of Planning and Budgeting*
Louis Harkey Mayo, B.S., J.S.D., *Vice President for Policy Studies and Special Projects*
Frederick Justin Naramore, B.S., C.P.A., *Comptroller*
William Parkhurst Smith, Jr., B.A., M.B.A., M.A. in Ed., *Vice President for Student Affairs*
Robert Gebhardtsbauer, B.A., M.A., *Registrar*
Joseph Young Ruth, B.A., *Director of Admissions*

COLLEGE OF GENERAL STUDIES

Robert Lee Holland, Ph.D., *Dean of the College of General Studies*
Charles McKay Chambers, Ph.D., *Associate Dean of the College of General Studies, for Planning and Development*
Alvin Carl Jensen, Ed.D., *Associate Dean of the College of General Studies*
Ruth H. Osborn, Ed.D., *Assistant Dean of the College of General Studies, Continuing Education for Women*

* Alumni trustee.

OLUMBIAN COLLEGE OF ARTS AND SCIENCES

Calvin Darlington Linton, Ph.D., *Dean of Columbian College of Arts and Sciences*
Barbara Joan Dunham, M.A., *Assistant Dean of Columbian College of Arts and Sciences*
Joseph Louis Métivier, Jr., M.A., *Assistant Dean of Columbian College of Arts and Sciences*
Robert Clinton Rutledge, Ph.D., *Assistant Dean of Columbian College of Arts and Sciences*
Harry Elwood Yeide, Jr., Ph.D., *Assistant Dean of Columbian College of Arts and Sciences*

RADUATE SCHOOL OF ARTS AND SCIENCES

Henry Solomon, Ph.D., *Dean of the Graduate School of Arts and Sciences*
Edward Alan Caress, Ph.D., *Assistant Dean of the Graduate School of Arts and Sciences*
David Alton Rowley, Ph.D., *Assistant Dean of the Graduate School of Arts and Sciences*

HOOL OF ENGINEERING AND APPLIED SCIENCE

Harold Liebowitz, D.Ae.E., *Dean of the School of Engineering and Applied Science*
James Elmer Feir, Ph.D., *Assistant Dean of the School of Engineering and Applied Science*

HOOL OF EDUCATION

Sidney Tillman, Ed.D., *Dean of the School of Education*
Robert Edward Baker, M.A., Ed.D., *Assistant Dean of the School of Education*

HOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

Peter B. Vaill, B.A., D.B.A., *Dean of the School of Government and Business Administration*
Harry Robert Page, Ph.D., *Associate Dean of the School of Government and Business Administration*
John Lobuts, Jr., B.S., Ed.D., *Assistant Dean of the School of Government and Business Administration*

HOOL OF MEDICINE AND HEALTH SCIENCES

Lawrence Thompson Bowles, M.D., Ph.D., *Acting Dean for Academic Affairs of the Medical Center and Associate Dean for Curricular and Student Affairs*
Michael McCally, M.D., Ph.D., *Associate Dean for Allied Health Programs of the Medical Center*

COLLEGE OF GENERAL STUDIES

Dean R.L. Holland
Associate Deans C.M. Chambers, A.C. Jensen
Assistant Dean Ruth H. Osborn

DEAN'S COUNCIL

R.L. Holland *(Chairman)*, R.E. Baker, Guy Black, R.G. Brown, B.I. Levy, D[illegible] Rowley, R.C. Rutledge

COMMITTEE ON SCHOLARSHIP

B.J. Dunham, A.C. Jensen, D.C. Linkowski, J.F. Lobuts, G.E. McCandless, J.A. Morgan, Jr., E.K. Winslow

INTRODUCTION

The College of General Studies, the off-campus division of George Washington University, was established in 1950 to extend the educational resources of the University to the community. The College continues in expanding the University's activities by providing academic programs for adult students and



helping to meet the continuing educational requirements of the National pital area.

The College offers off-campus credit courses for the nondegree student, ether for personal enrichment or for updating or upgrading his professional dentials. Off-campus degree programs, administered by the College of Gen- Studies for other colleges and schools of the University, are offered at the dergraduate and graduate levels for students who wish to pursue a more mal program of study. Experimental pilot programs of study are developed operation with other colleges and schools of the University in response to ific needs of the government and business community. The College also elops and conducts noncredit courses, seminars, and workshops drawing on resources of the University.

The Staff of Instruction for the off-campus programs includes members of full-time faculty of the University and academically qualified part-time lec- rs from the Washington professional community.

The College works closely with education directors, public school officials, personnel administrators in government, business, and industry to develop ses of study and expand the educational opportunities for the mature stu- In cooperation with these sponsoring groups the College offers courses at ampus centers throughout the District of Columbia and in nearby Maryland Virginia. Government agencies and installations, business organizations, or fessional groups interested in having the College organize and conduct a se or a comprehensive educational program should contact the Associate n of the College of General Studies.

DEMIC STATUS

academic standards of the University are maintained in off-campus credit ses.

e College of General Studies is accredited by its regional accrediting y, the Middle States Association of Colleges and Secondary Schools.

EE PROGRAMS

mbian College of Arts and Sciences offers the following degrees off cam-

ociate in Arts in General Studies
helor of General Studies
helor of Science in Geodetic and Cartographic Science
helor of Science in Oceanography
Graduate School of Arts and Sciences offers the following degrees off

ter of Arts in Special Studies
ter of Science in Special Studies
School of Engineering and Applied Science offers the following degrees pus:

ter of Engineering Administration
ter of Science
tor of Science
School of Education offers the following degrees off campus:
ter of Arts in Education
cation Specialist

The School of Government and Business Administration offers the follow
degrees off campus:
Bachelor of Science in Administration
Master of Science in Administration

SPECIAL CREDIT PROGRAMS AND NONDEGREE PROGRAMS

SPECIAL CREDIT PROGRAMS

To encourage participation in foreign-tour programs and continuing educa
throughout life, courses designed to meet needs of interested individuals, g
and agencies are offered in the liberal arts, education, and other areas
further information contact one of the persons listed below.

NONDEGREE PROGRAMS

Courses, conferences, seminars, and institutes are offered to meet the needs
individuals and groups. They are designed for business, industry, and profe
sional groups. For further information contact one of the persons listed be
For information on programs in a general area, contact Charles Chambers,
sociate Dean of the College of General Studies, for Planning and Developm
telephone 676-7070.
For information on LEEP programs, contact Richard C. Allen, telephone 6
7390.
For information on programs concerning women, contact Ruth Osborn, Ass
ant Dean of the College of General Studies, for Continuing Education
Women, telephone 676-7036.
For information on Teacher's Programs, contact the geographic area direc
(see below).
For information on programs in specific geographic areas, contact Ralph
Belles, Director of District of Columbia Programs, telephone 676-7061; Dou
Carter, Director of Maryland Programs, telephone 676-7022; John Mor
Director of Virginia Programs, telephone 676-7040.

Admission

NO STUDENT may be denied admission to the University because of sex,
color, creed, or national origin.

NONDEGREE STUDENTS

Off-campus credit courses may be taken by nondegree students who
the prerequisites prescribed by the department concerned. A student who
been dismissed or required to withdraw from this or another institution is
eligible to register for at least one fall or one spring semester from the date
such action. Formal University admission is not required for registration.

Nondegree students wishing to enroll in graduate courses other than
offered by the School of Government and Business Administration must

ompleted a Bachelor's degree or have completed 90 semester hours of under-raduate work and the permission of the instructor. Nondegree students who ave not completed a Bachelor's degree may not enroll in graduate courses fered by the School of Government and Business Administration.

Credits earned as a nondegree student may later be transferred to degree ograms at George Washington University or other colleges and universities, oviding they are applicable to the desired curriculum, providing the student eets the requirements of the degree program for which he is applying, and oviding all other requirements of the appropriate school are met.

ADMISSION AS A DEGREE CANDIDATE

dents wishing to be admitted as candidates for one of the off-campus under-aduate or graduate degree programs of George Washington University may tain application forms from the College of General Studies, one of the Uni-sity's off campus Representatives, or the Education Officer of his agency or tion. For information on the procedure to be followed when applying admission to campus degree programs, refer to the appropriate catalogue of orge Washington University.

An application for admission, required credentials, and a nonrefundable lication fee* of $10 (for undergraduate study) or $25 (for graduate study) uld be sent to the appropriate office.

Records presented become the property of the University and *cannot* be rned.

DERGRADUATE DEGREE CANDIDACY

pleted application, required credentials, and the application fee should be to the Office of Admissions, George Washington University, 2121 Eye et, N.W., Washington, D.C. 20052.

condary school graduates applying for Associate in Arts in General dies or Bachelor's degree candidacy must present the combined evidence of an acceptable certificate of graduation from an accredited secondary ol, showing a minimum of fifteen "units"† in a college preparatory or demic curriculum; (2) the principal's statement that the applicant is ade-y prepared to undertake college work with reasonable prospect of suc-3) College Entrance Examination Board scores on the Scholastic Apti-Test and the English Composition Achievement Test (for students out of school several years, other appropriate tests may be prescribed). The Col-Entrance Examination Board tests are preferred; however, the American

---

* application fee must be by check or postal money order, payable to George Washington y.

application fee is waived for graduates of this University applying to the Graduate School of Sciences, and for students applying for readmission who were registered as degree can-at the time of their last registration at this University and who have not since registered other institution.

represents a year's study in a secondary school subject, including in the aggregate no less sixty-minute periods, or the equivalent, of prepared classroom work.

College Testing battery scores will be accepted. The applicant should reque
that these scores be sent to the Office of Admissions directly from the Educa
tional Testing Service, Princeton, N.J., or Berkeley, Calif.; or from the Amer
can College Testing Program, Iowa City, Iowa.

Applicable only to Columbian College of Arts and Sciences.—Mature st
dents who do not meet the above requirements may be considered for degre
candidacy after the satisfactory completion of at least 15 semester hours
course work with a grade-point average of 2.00 or better. This must inclu
courses in English Composition (Engl 9 or 10 and 11), and 9 semester hours
course work in at least two of the following appropriate areas: Humanities (l
erature, philosophy, foreign languages), Social Studies (anthropology, econo
ics, geography, history, political science, psychology, sociology), Natural a
Mathematical Sciences.

The selection of qualifying courses should be made in conference with
faculty adviser, and a conference concerning plans for study is require
each applicant for admission to candidacy.

Applicable only to the School of Government and Business Administra
—Students who have been out of secondary school for three years or more
who do not meet the above requirements may be considered for degree
didacy after the satisfactory completion of at least 15 semester hours of co
work with a quality-point index of 2.50 or higher. This must include eco
in English Composition (Engl 9 or 10 and 11), and 9 semester hours of cou
work selected from the first-year curriculum of the Bachelor of Science in
ministration degree program.

The selection of qualifying courses should be made in conference with
faculty adviser. A conference concerning plans for study as a degree candi
is required of each applicant before admission to candidacy.

ADVANCED STANDING AND ADVANCED PLACEMENT

TRANSFER STUDENTS FROM OTHER COLLEGES AND UNIVERSITIES

Properly certified courses taken at accredited colleges or universities ma
applied toward a degree, subject to the curriculum requirements of the deg
program and the rules of the college or school to which admission is sou

Although a grade of *D* is not acceptable for transfer, the course ma
used to satisfy a curriculum requirement. Credits earned with a *D* grade
not, however, be counted toward the total number of semester hours requ
for the degree. Any course completed with a grade of *D* or better may no
repeated for the purpose of earning degree credit.

Transfer students whose previous academic records raise doubts of their
ity to complete degree requirements successfully must complete 15 hours
course work in this College with a quality-point index of 2.50 or higher, be
considered for degree candidacy. Courses taken to qualify for candidacy m
be distributed over two or more of the following areas: Humanities (literat
philosophy, foreign language), Social Studies (anthropology, economics, ge
raphy, history, political science, sociology), and Natural and Mathemat
Sciences. (Students who have not successfully completed an acceptable co
course in English Composition must include Engl 9 or 10 and 11.) Applica
who have been suspended for academic reasons from this University or any
institution must fulfill this same 15-hour requirement and also obtain w

pproval of a petition for admission to degree candidacy from the Committee on dmission and Advanced Standing of Columbian College of Arts and Sciences from the Dean of the School of Government and Business Administration. In no case will more than 60 semester hours of advanced standing be granted r course work completed at a community or junior college to those students anning to enroll in the Bachelor of Science in Administration degree program. ccounting and Business Administration courses taken at such colleges may be plied toward the Bachelor of Science in Administration degree provided they e comparable to the School of Government and Business Administration urses numbered under 100. Courses comparable to BAd 161, Mgt 118, 119, Stat 97 may also be applied. Other courses (one course per area up to a ximum of three courses), comparable to this School's courses numbered –200, taken at an accredited community or junior college where a grade of or better has been earned may be accepted to waive certain required courses; wever, the waiver of a required course does not entitle the student to any mester hours of credit toward the total 60 semester hours required for the hor or senior years.

The University reserves the right to refuse credit for transfer in whole or in rt, or to allow it provisionally. Credit so given may be withdrawn for subient poor work.

It is the responsibility of the student to have an official transcript sent directly m each institution formerly attended to the Office of Admissions, George shington University, Washington, D.C. 20052.

NG CREDIT OR WAIVING REQUIREMENTS BY EXAMINATION

ddition to credit allowed in transfer from other accredited colleges or unities, a maximum of 30 semester hours of advanced standing may be obed by any one or any combination of the following methods.

student may earn up to a maximum of 30 hours, or waive curricular rements without limitation *(passing a waiver examination does not entitle the ent to any semester hours of credit)*, by performing satisfactorily on any or of the following:

dvanced Placement Tests (APT).—Administered by the College Entrance mination Board.

chievement Tests (may be used to waive requirements only).—Administby the College Entrance Examination Board.

ege-Level Examination Program (CLEP).—(CLEP offers two types of minations: General and Subject Examinations. CLEP General Examinare offered in five areas: mathematics, social sciences, humanities, natural nces, and English composition. CLEP Subject Examinations measure evement of specific college-level courses and are offered in more than 20 cts.)

om admission to degree candidacy, credit is assigned for the General Exations, with the exception of the English composition examination, passed e 50th percentile or above (college sophomore norms). Credit is assigned e Subject Examinations passed at the level recommended in the College l model policy. A candidate for a degree from any school at this Uni must seek departmental approval *prior* to taking the examination to reredit for a CLEP Subject Examination. Credit may not be earned by g the examination after having taken the equivalent course. Arrange-

ments for the examinations are the responsibility of the applicant and sho
be made with the College Entrance Examination Board College-Level Examin
tion Program, Box 592, Princeton, N.J. 08540.*

*Special Departmental Examinations in Columbian College of Arts a
Sciences.*—A student may request any department of Columbian College to off
him a special examination covering the subject matter of any specific cours
Approval is not automatically granted; the student must offer evidence that h
has sufficient background to have a reasonable command of the subject matt
(A student who has previously taken examinations to waive course requirement
may not subsequently take examinations for credit in the same courses.) If
CLEP Subject Examination is available, the department may choose to emplo
it. Assigning credit (advanced placement) or waiver of a requirement by spe
cial departmental examinations will depend on the department's evaluation o
the examination paper. Special departmental examinations will normally be
at least three hours' duration. A $25 fee is charged for preparation, admin
tration, and grading of each course examination.

Service Schools.—A maximum of 30 (or a maximum of 12 hours if
courses are "professional") semester hours may be obtained on the basis of s
ice schools satisfactorily completed, as evaluated in accordance with the *Gu
to the Evaluation of Educational Experience in the Armed Forces.* Ordina
such subjects are counted as electives. No credit will be allowed for milit
experience as such.

Correspondence Courses.—A maximum of 15 semester hours may be earn
through the successful completion of correspondence courses of college
which are offered by the U.S. Armed Forces Institute or a regionally accredi
college or university.

Examination for Waiving Curriculum Requirements.—A student wishing
omit a required course may, with the permission of the faculty adviser, take
waiver examination, the passing of which relieves him of the curriculum requ
ment and qualifies him for registration in an advanced course. The fee for ea
3-hour course examination is $5.

*Credit Earned Through United States Armed Forces Institute (USAFI
Except for those students enrolled as candidates for the Bachelor of Science
Administration degree, credit is assigned for approved United States Armed
Forces Institute college-level examinations passed with satisfactory scores.

GRADUATE DEGREE CANDIDACY

MASTER'S DEGREES

The Degree of Master of Arts in Education (School of Education).—Ap
cation for Master's degree candidacy should be filed by June 1 for the fall
mester, April 1 for the summer session, or November 1 for the spring seme
Completed application, required credentials, and the application fee shou
sent to the Office of the Dean, School of Education, 2201 G Street, N
Washington, D.C. 20052.

---

* CLEP examinations in Introductory Accounting, Introduction to Business, Commercial Law
Data Processing are limited to 3 credits each of advanced standing in the School of Govern
and Business Administration. All other CLEP examinations in Accounting and Business Ad
tration (School of Government and Business Administration courses) are not accepted for ad
standing.

Admission to graduate study toward a Master's degree requires a bachelor's
egree from an accredited institution, an undergraduate quality-point index of
50 (a C+ average) or above, demonstrated interest in teaching, appropriate
ndergraduate work, and personal traits that show promise as a teacher. Two
ars of successful teaching are required before admission to candidacy in the
d of school administration. Experience is required for admission to pro-
ams in adult education and human resource development.

*The Degree of Master of Science in Administration (School of Government
d Business Administration).*—Application for Master's degree candidacy *must*
made before or at the time of registration for the initial course work. Com-
ted application, required credentials, and the application fee should be sent
the Admissions Officer, School of Government and Business Administration,
21st Street, N.W., Washington, D.C. 20052.

A bachelor's degree from a regionally accredited college or university that
des at least 90 semester hours of academic work, with an overall under-
uate quality-point index of 2.5 (on a 4.0 scale) and a score of at least the
percentile on the Admission Test for Graduate Study in Business (ATGSB)
quired.

tudents with an undergraduate quality-point index of 3.0 (a *B* average) may
dmissible without an admission test.

tudents whose undergraduate quality-point index is less than 2.5 or whose
mon test score ranks beneath the 50th percentile will be admitted if (1)
uality-point index multiplied by 200 and added to the ATGSB score equals
points, or (2) the upper division undergraduate (last two years of under-
uate work) quality-point index multiplied by 200 and added to the admis-
test score equals 1,000 points.

he Admission Test for Graduate Study in Business* must be taken prior to
ation for degree candidacy or during the semester in which application is
. For information concerning the date and place for taking the test, con-
the Educational Testing Service, Box 955, Princeton, N.J. 08540.

o more than 6 semester hours of credit toward the Master's degree will be
t for work taken in nondegree status at this University (before applica-
to this degree program and while the application is being processed).

maximum of 6 semester hours of advanced standing may be credited
the degree by transfer of credit for approved graduate work taken at an
ted college or university. Request for advanced standing must be made
me of application for Master's degree candidacy.

Degrees of Master of Arts in Special Studies or *Master of Science in
l Studies (Graduate School of Arts and Sciences).*—These Master's de-
off-campus programs are arranged for groups of students participating in a
ular program which has been approved by the Graduate School of Arts
iences. Application for Master's degree candidacy must be made by mem-
the group before registration. Completed application, required creden-
and the application fee should be sent to the Office of the Dean, Graduate
of Arts and Sciences, 2000 H Street, N.W., Washington, D.C. 20052.
ission to graduate study toward a Master's degree in this School requires
lor's degree, from an accredited college or university, with an over-all
-point index of 3.00 (a *B* average) or an equivalent grade.

* a test of general aptitude and does not presume an undergraduate major in Business
ation.

No more than 9 semester hours of credit toward a Master's degree wi
granted for work taken in nondegree status at this University.

A maximum of 9 semester hours of advanced standing may be credi
toward a Master's degree by transfer of credit for approved graduate cred
work taken at an accredited college or university.

The Degrees of Master of Science or *Master of Engineering Administrati*
(School of Engineering and Applied Science).—Application for Master's deg
candidacy *must* be made before registration. Completed application, req
credentials, and the application fee should be sent to the Manager of Eng
ing Admissions, School of Engineering and Applied Science, 725 23rd Stre
N.W., Washington, D.C. 20052.

Admission to graduate study toward a Master's degree requires an appropr
bachelor's degree from a recognized institution and evidence of capacity
productive work in the field selected, as indicated by undergraduate gra
Graduate Record Examination scores, and similar data.

An applicant who has significant deficiencies in preparation may be req
to take prescribed undergraduate courses as an unclassified student before b
admitted to graduate student status. In some cases, if such deficiencies
minimal, he may be admitted to graduate student status and allowed to
limited number of graduate courses while completing the undergraduate cou
in which he is deficient. In no case may the undergraduate courses thus
fulfill any part of the requirements for the Master's degree.

Students wishing to apply for admission to the program of study leading
the degree of Master of Engineering Administration are required to meet
following additional admission requirements: (1) the applicant must have
adequate knowledge of the principles of human relations, the fundamentals
engineering economic analysis, and the fundamentals of quantitative metho
This requirement can be met by satisfactory completion of the following
graduate courses or approved equivalents: EAd 150, *Introduction to Engi*
ing Administration; EAd 160, ***Introduction to Engineering Economic An***
and EAd 170, ***Basic Quantitative Methods for Engineering Administration***
The applicant may be required to complete other undergraduate prerequ
courses prescribed as a condition of admission. (3) A student is required to
the grade a *C* or better in these courses (unless the requirement is stipulate
be a grade of *B* or better upon his admission) in each undergraduate pre
site course. If this scholarship requirement is not met, the student is
from further enrollment. A student is not permitted to repeat any of the
graduate prerequisite courses. Credit for prerequisite courses is not appl
toward the degree of Master of Engineering Administration.

Up to 6 semester hours of satisfactory credit (with grades of *A* or *B*),
normally must have been earned in a graduate program at another recog
institution, *may* be accepted in transfer, when applicable, to satisfy Mas
degree requirements in the School of Engineering and Applied Science
ever, the student must, with the approval of his adviser, petition to the
priate department chairman for such a transfer.

EDUCATION SPECIALIST DEGREE

The Degree of Education Specialist (School of Education).—Each app
must be interviewed and recommended by a staff member of the School of
cation or by a representative in the candidate's locality appointed by the D
Admission requires a Master of Arts in Education degree from this Univ

r the equivalent), a satisfactory score on the Miller Analogies Test or the
raduate Record Examination, and two years of successful pertinent experi-
ce. Completed application, required credentials, and the application fee
ould be sent to the Office of the Dean, School of Education, 2201 G Street,
W., Washington, D.C. 20052.

CTOR OF SCIENCE DEGREE

The Degree of Doctor of Science (School of Engineering and Applied
ience).—The prospective doctoral student seeking admission should apply
fore June 1 for the fall semester and before December 1 for the spring se-
ster. Personal interviews may then be arranged to discuss the applicant's
ifications and the possibilities for an effective doctoral program. The appli-
must arrange for complete documentary records (transcripts) to be for-
ded to the Manager of Engineering Admissions, School of Engineering and
ied Science, 725 23rd Street, N.W., Washington, D.C. 20052, in sufficient
e to permit assembly of complete records for evaluation as soon after the
ve application deadlines as possible.

To be admitted to the doctoral program, a satisfactory Master's degree from
ccredited institution is required, together with acceptable personal qualities
a capacity for creative scholarship. Normally, a *B* average in graduate
k is required. However, the minimum does not assure automatic accept-
the departments may, and often do, set higher admission standards. The
icant must arrange for letters of recommendation to be submitted from two
; members of the institution from which he received his Master's degree;
these, if possible, should be from his Master's adviser. The letter should
ddressed to the appropriate department chairman.

to 6 semester hours of credit earned in courses completed with the grade
or *B* while enrolled in a doctoral program at another accredited institu-
may be accepted in transfer to satisfy doctoral requirements at this School,
ect to the approval of the student's adviser and his department chairman.
earned in courses completed more than five years prior to admission to
octoral program will not be accepted in transfer, and some departments
equire that transfer credit must have been earned within a shorter period
e before admission.

MISSION

dent who withdraws, is suspended, or is otherwise absent from the Univer-
one semester or more, may re-enter and continue his work only under
les and regulations in force at the time of his return. Complete and
transcripts from each institution the student has attended since making
ious application must be sent to the appropriate office at this University
his application for readmission can be evaluated.

there are curriculum changes in graduate programs in the School of
ment and Business Administration, the readmitted student may be re-
to take additional course work in preparation for the Master's Compre-
Examinations.

Registration

MPUS REGISTRATION is conducted before or at the first class meet-
each course, at times and places stated in the *Off-campus Schedule of*
available well in advance of each semester.

Registration in an off-campus course *constitutes admission to that ... only*. It does not admit the student to campus courses or to degree cand... Only students admitted to degree candidacy may enroll as full-time st... (for 12 semester hours or more). Those who have been graduated from ... school recently and wish to be *full-time freshman* students at this Un... should apply for admission to the appropriate college or school on camp...

Off-campus degree candidates in an area of concentration with a small ... ment which would not justify offering courses off campus may have to ... for campus courses in order to meet the requirements for the degree. P... sion must be secured from the College of General Studies at least two ... prior to registration for courses in the School of Government and Busine... ministration.

Auditing.—With the permission of the instructor, students may regis... "Auditors." An auditor is not required to take active part or to take ex... tions; he receives neither grades nor credit. Tuition is the same for the ... as for the student registered for credit. With the approval of the De... student may change from credit to audit status during the first third ... semester. A student who takes a course as an auditor may not repeat ... for credit.

Concurrent Registration.—A student registered as a degree candidate in ... other college or school of the University may take credit courses in the C... of General Studies *only by permission (granted prior to registration) ... dean* of the college or school concerned. A "College of General Studies ... campus Concurrent Registration Permit" form must be obtained from ... appropriate college or school, signed by the dean of that college or schoo... presented at the time of registration in the College of General Studi...

Service personnel enrolled full time for campus courses need the permi... of the Dean of the College of General Studies to register concurrently f... campus courses.

Any student taking course work in another college or school of the U... sity or at another institution through the Consortium of Universities ... Washington Metropolitan Area, Inc., must have the permission of his ...

Fees and Financial Regulations

ALL FEES should be paid by check or money order, made payable to G... Washington University. The student identification number should appear ... upper left-hand corner.

The following fees were adopted for the academic year 1975–76. (See ... 26–27 for projected tuition and fee increases for 1976–79.)

Tuition[*]

On campus:

Part-time undergraduate program or hours in excess of 18, for each ... semester hour .....

[*] Students interested in full-time undergraduate study on campus should consult the ... catalogue (*Undergraduate and Graduate Catalogue, School of Engineering and Applied S... logue*, or *School of Medicine and Health Sciences Catalogue*).

Graduate study other than in the School of Engineering and Applied Science, for each semester hour 94.00

Graduate study in the School of Engineering and Applied Science, for each semester hour 96.00

off campus:*

For each semester hour 70.00

School of Engineering and Applied Science off-campus programs, for each semester hour † 96.00

ICAF programs, for each semester hour 81.00

thesis:‡

ICAF programs, for each semester hour 81.00

Master of Arts in Education and Master of Science in Administration degree programs (other than ICAF), for each semester hour 94.00

School of Engineering and Applied Science programs, for each semester hour† 96.00

University Center Fee (charged only to students registered on campus, nonrefundable)

For students registered for 11 or more semester hours on campus:

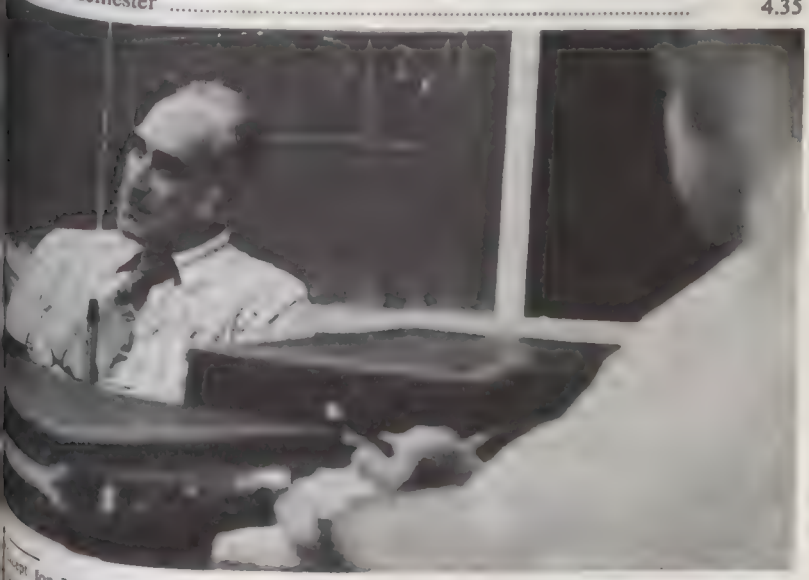
For each semester 46.50

For students registered for less than 11 semester hours in a semester on campus:

For each semester hour for which the student registers 4.35

For on-campus degree candidates maintaining "continuous registration" terms:

For each semester 4.35



*Except for ICAF and School of Engineering and Applied Science programs.

†Fee does not apply to special off-campus programs arranged with the School of Engineering and Applied Science.

‡Payment of tuition for a Master's thesis entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. If the thesis is unfinished, additional time may be granted in accordance with the regulations of the school in which the student is registered. (See page 36 for regulations governing military leave.)

Special Fees

Application fee (undergraduate degree candidate), nonrefundable .....

Application fee (graduate degree candidate), nonrefundable .....

Graduation fee, due and payable at the time of registration for the last semester or summer session:

Associate's degree .....

Bachelor's, Master's, and Doctor of Science degrees.....

Special Columbian College of Arts and Sciences departmental examination fee, for each course to qualify for receiving credit (advanced standing), waiver of requirement, or both.....

Continuous Registration fee, *off-campus degree candidates (other than those in the School of Engineering and Applied Science)*, to maintain "continuous registration" during any semester of absence from the University* .....

Continuous Registration fee, *on-campus or off-campus†, degree candidates in the School of Engineering and Applied Science*, to maintain "continuous registration" during any semester of absence from the University or after completion of tuition requirements* .....

Continuous Registration fee, *ICAF degree candidates*, to maintain "continuous registration" during any semester of absence from the University*..

Late-registration fee, for failure to register for campus courses within the designated period .....

Fee for binding two copies of the Master's thesis (other than ICAF programs) .....

Fee for binding two copies of the Master's thesis (ICAF programs) .....

Fee for Microfilm Service and Printing Announcement of Final Examination (Doctor of Science candidates) .....

Late-payment fee, for failure to make payments when due (see "Payment of Fees," pages 28–29) .....

On-campus financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," pages 28–29) .....

Off-campus financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," pages 28–29) .....

Returned check fee, charged a student whose check is improperly drafted, incomplete, returned by the bank for insufficient funds, or for any other reason .....

Fee for each examination to waive a curriculum requirement .....

Transcript fee, charged for each transcript of record .....

Replacement of lost or stolen picture identification card .....

PROJECTED TUITION AND FEE INCREASES 1976–79

Projected increases for the academic years 1976–77, 1977–78, and 197[illegible] have been estimated as follows:

---

* Payment of the continuous registration fee entitles the student who is granted leave of [illegible] to return and continue his work toward a degree under the academic requirements which [illegible] force at the time of his first registration. The continuous registration fee applies toward [illegible] tuition fee nor residence requirements for the degree. This fee does not apply to students [illegible] military leave (see page 36).

† This fee does not apply to special off-campus programs arranged with the School of Engi[illegible] and Applied Science.

On Campus*

Increase by semester hour (graduate and part-time undergraduate students):

1976–77	$4.00
1977–78	7.00
1978–79	5.00

The University Center fee will be increased for the 1976 summer sessions and the academic year 1976–77. For students taking 11 or more semester hours, the fee will not be more than $52.50 a semester, a maximum increase of $5. Students taking less than 11 semester hours will not pay more than $5 a semester hour, a maximum increase of $.65.

Off Campus

Increase by semester hour (except ICAF and School of Engineering and Applied Science programs):

Course Work Other than Thesis

1976–77	$4.00
1977–78	7.00
1978–79	4.00

Thesis for Master of Arts in Education and *Master of Science in Administration programs*

1976–77	4.00
1977–78	7.00
1978–79	5.00

Increase by semester hour (ICAF programs including thesis):

1976–77	4.00
1977–78	4.00
1978–79	4.00

Increase by semester hour (School of Engineering and Applied Science programs including thesis):

1976–77	4.00
1977–78	7.00
1978–79	5.00

Every effort will be made to keep tuition increases within the above limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment of these estimates.

---

*Students interested in full-time undergraduate study on campus should consult the appropriate catalogue (*Undergraduate and Graduate Catalogue, School of Engineering and Applied Science Catalogue, School of Medicine and Health Sciences Catalogue*).

**Semester-hour increases become effective at the beginning of the summer sessions preceding the academic year.

***Increase by semester hour does not include the projected increases for special off-campus programs arranged with the School of Engineering and Applied Science.

PAYMENT OF FEES

OFF-CAMPUS COURSES

Fees for each semester are due and payable in full at the time of each re- tration; however, a student registering for a *thirteen-week credit course* sign a deferred payment contract at each registration to make payments in equal installments—one-third at the time of registration, one-third by O 7, 1975, and one-third by November 4, 1975 (for the fall semester); one by February 10, 1976, and one-third by March 10, 1976 (for the spring ter). Payments are due at the stipulated times. Interest at the rate of 8 p per annum on the unpaid balance will be charged from the beginning o semester to the date payment is made.

Students receiving partial government tuition assistance must pay their p tion of the tuition in full at the time of registration.

Except for specified special sessions, tuition and fees for credit course ing less than twelve weeks, and for all noncredit courses, are payable in registration.

Students who fail to make any payment when due will be automa charged a $15 late-payment fee and will be subject to an interest charg 8 per cent per annum. Accounts which become 30 days past due will be fi cially encumbered. In the event a student's account is financially encumbe the student forfeits his rights to the use of deferred payment contracts ture semesters, and the Student Accounts Office will notify the Regist withhold grades, future registration privileges, transcripts, diplomas, and academic information until the account is settled financially. Financial ment will require payment in full of all amounts due the University in tion to a financial reinstatement fee of $15.

Students auditing courses are subject to all fees charged to students re tered for credit.

CAMPUS COURSES

No student is permitted to complete registration or attend classes until charges are paid. Tuition and fees for each semester are due and payable full at the Office of the Cashier at the time of each registration. Checks postal money orders should be made out to George Washington University student identification number shown in upper left hand corner.

The Student Accounts Office has responsibility for billing and maint student accounts for tuition, various fees, and room and board charges. A dent registered for 6 semester hours or more may sign a deferred pay contract with the Student Accounts Office at the time of each registration mitting him to pay one-half of the total tuition and fees (except for fees able in advance) at the time of registration and the remaining half on o fore October 22, 1975 (for the fall semester), and March 10, 1976 (fo spring semester). Interest at the rate of 8 per cent per annum on the balance will be charged from the date of registration to the date payme made.

Students receiving tuition assistance in the form of scholarships, gover tuition contracts, or other forms of tuition awards are not permitted to

eferred payment contracts unless the total tuition and fee charges exceed the
ine of the tuition awards by $600 or more. Under such circumstances the
udent may be permitted to pay one-half of the amount due from the student
the time of registration and to defer the balance by signing a deferred pay-
ent contract.

Students who fail to make any payment when due will be automatically
arged a $15 late-payment fee and will be subject to the interest charge of 8
r cent per annum. Accounts which become 30 days past due will be finan-
lly encumbered. In the event a student's account is financially encumbered,
e student forfeits his rights to the use of deferred payment contracts in fu-
re semesters, and the Student Accounts Office will notify the Registrar to
thhold grades, future registration privileges, transcripts, diplomas, and other
demic information until the account is settled financially. Financial settle-
nt will require payment in full of all amounts due the University in addition
a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students regis-
ed for credit.

FUND OF FEES FOR OFF-CAMPUS REGISTRATION*

plications for withdrawal from the University or for change in class sched-
must be made in person or in writing to the dean of the college, school, or
sion in which the student is registered. Notification to an instructor is not
acceptable notice.

n authorized withdrawals and changes in schedule, cancellations of semes-
tuition charges will be made in accordance with the following schedule for
academic year:

REFUND SCHEDULE 1975–1976

Session (or any session longer than 13 weeks)

90% Starting date of class plus 6 calendar days
75% Starting date of class plus 20 calendar days
50% Starting date of class plus 34 calendar days
0% Starting date of class plus 35 calendar days to end

Session (7 weeks, 2 days per week)

90% Starting date of class plus 2 calendar days
75% Starting date of class plus 8 calendar days
50% Starting date of class plus 15 calendar days
0% Starting date of class plus 16 calendar days to end

*Regulations concerning refunds of fees for students who register for courses on campus, see *Undergraduate and Graduate Catalogue*, the *School of Engineering and Applied Science Catalogue*, or the *Summer Sessions Catalogue*.

Mini Session (3 weeks)

90%	Starting	date of	class	plus	1 calendar day
75%	Starting	date of	class	plus	5 calendar days
50%	Starting	date of	class	plus	9 calendar days
0%	Starting	date of	class	plus	10 calendar days to end

No refund will be awarded for sessions of less than 21 days.

No exceptions will be made for holidays, late registration, absences, or cla
rescheduling for any reason whatsoever.

A student who is granted military leave before completing the semester w
receive credits for current charges in accordance with the schedule for wi
drawals from the University (see above). Payments made in excess of the n
refundable balance will be refunded to the student. The nonrefundable balan
will be maintained as a deferred credit for use by the student when he retu
to the University (see "Military Leave," page 36).

In no case will tuition be reduced or refunded because of absence from classe

Payment applies only to the semester for which a registration charge is
curred and will not be credited to another semester (exception: students grant
military leave, see page 36).

Authorization to withdraw and certification for work done will not be given
student who does not have a clear financial record.

Regulatio

CAMPUS STUDY

OFF-CAMPUS DEGREE CANDIDATES may register for campus courses appro
for their programs if these courses are not available at off-campus cent
Students must notify the Office of Student Records, College of Gen
Studies, telephone 676–7017, at least two weeks prior to the date of campus r
istration so that registration materials may be prepared. This material may
picked up by the student at Building K, 817 23rd Street, N.W., during regis
tion.

A student may register for on-campus courses as a nondegree student in
Division of University Students, telephone 676-6370.

ACADEMIC WORKLOAD

Only students admitted to degree candidacy may enroll as full-time stude
i.e., for 12 or more hours in a semester. Students taking course work to q
for degree candidacy who are registered in this College may not take m
than 10 hours in a semester.

A full-time undergraduate student in Columbian College of Arts and Scie
who is not on probation may not ordinarily take more than 17 semester ho

student employed more than 20 hours a week, who is not on probation, may ot take more than 10 hours.

A full-time student in the School of Government and Business Administration who is not on probation may not ordinarily take more than 15 semester ours. A student employed more than 24 hours a week, who is not on probation, may not take more than 9 semester hours.

A full-time undergraduate student who is a candidate for a degree in the chool of Government and Business Administration and whose quality-point erage is 3.50 or higher may not take more than 18 hours. An employed undergraduate student who meets the same standard may not take more than 12 urs.

A full-time undergraduate student who is a candidate for a degree in Columbia College of Arts and Sciences and who, during the immediately preceding semester, has received no grades below *B* and has earned grades of *A* in three courses totaling at least 9 semester hours may take 18 or 19 hours. An employed undergraduate student who, during the immediately preceding semester, has no grades below *B* and has earned grades of *A* in two courses totaling at least 6 semester hours may not take more than 12 hours.

A student on probation normally may not take more than 3 semester hours.

A student who accepts employment after registration or at any time during a semester must report that fact immediately to the Dean so that his program may be adjusted, if necessary.

A full-time graduate student who is a candidate for a degree in the School of Government and Business Administration may not take more than 12 semester hours. A graduate student who is employed more than 20 hours a week may not take more than 6 hours.

A full-time student in the Graduate School of Arts and Sciences registers for 9 to 12 semester hours each semester; a part-time student registers for 6 semester hours each semester. These requirements do not apply when a student has fewer than 9 semester hours (full-time) or 6 semester hours (part-time) remaining to complete his program. No more than 15 semester hours may be taken during any one semester.

TTENDANCE

student may not attend classes until registration is completed and fees due paid. He may attend only those classes for which he is registered.

The student is held responsible for all the work of the course in which he is gistered, and all absences must be excused by the instructor in charge before vision is made for the student to make up work missed.

HOLARSHIP

ADES

ades are mailed to the student through the Office of the Registrar at the se of each semester. They are not given out by instructors or the administrative staff.

NDERGRADUATE

e following grading system is used: *A*, Excellent; *B*, Good; *C*, Satisfactory; Low Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal. Except for

courses which specifically state that repetition for credit is permitted, a stude
may not repeat for credit a course in which he has received a grade of *D*
better, unless required to do so by the department concerned. A written sta
ment to this effect must be submitted to the Registrar by the appropriate
partmental chairman.

GRADUATE

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Minimu
Pass; *F*, Fail; *I*, Incomplete; *CR*, Credit; *W*, Authorized Withdrawal. Exce
for courses which specifically state that repetition for credit is permitted,
student taking School of Education and School of Government and Busine
Administration courses may not repeat for credit a course in which he h
received a grade of *C* or above. A student taking a Graduate School of Ar
and Sciences course may repeat for credit a course in which he has receive
a grade of *C* or above only when permitted to do so by the department co
cerned, unless the course description states that the course may be repeat
for credit. A written statement to this effect must be submitted for appro
to the Dean's Office. It is then filed with the Registrar. A student take
School of Engineering and Applied Science courses may not repeat for cre
a course in which he has received a grade of *C* or above, unless required to
so by the department concerned; a written statement requiring the student
repeat such a course for credit must be submitted to the Registrar by
appropriate department chairman.

INCOMPLETE/AUTHORIZED WITHDRAWAL

Whenever a grade has not been assigned, the symbol *I* (Incomplete) or
symbol *W* (Authorized Withdrawal) will be recorded. The symbol *I* indicat
that a satisfactory explanation has been given the instructor for the studen
failure to complete the required work of the course. At the option of
instructor, the grade of *I* may be recorded if a student, for reasons beyond
control, is unable to complete the work of the course, and if the instructor
informed of, and approves, such reasons before the date when grades must
reported. The grade may be used only if the student's prior performance
class attendance in the course have been satisfactory. Any failure to comp
the work of a course which is not satisfactorily explained to the instruc
before the date when grades must be turned in will be graded *F*. If acceptab
reasons are later presented to the instructor, he may initiate an appropri
grade change.

REMOVING AN INCOMPLETE

For information concerning the removal of a grade of Incomplete from a
dent's record, consult the regulations of the college or school (see pages 46,
64, 66, and 74).

QUALITY-POINT INDEX*

Quality points are computed from grades as follows:

For each semester hour of the letter grade—*A*, 4 points; *B*, 3 points; *C*,
points; *D*, 1 point; *F*, no points.

* Not applicable to graduate study in the School of Engineering and Applied Science

Scholarship is computed in terms of the quality-point index. This is done by ...ding the total number of quality points by the total number of semester ...ours for which the student has registered. Example: if a student received an ... n one three-credit course, and a *B* in another three-credit course, he would ...mpute his quality-point index this way:

= 4 x 3 (semester hours) = 12
= 3 x 3 (semester hours) = 9

6 — 21 ÷ 6 = 3.5 quality-point index

Courses marked *W, I, CR, or NC* are not considered in determining the in... except that courses marked *I* will be considered when a formal grade is re...ded. Grades in courses taken at other institutions are not considered in ...puting the quality-point index.

...NINGS

...ated intervals during the academic year students who are doing work of *D* ...de or lower in courses with departmental numbers below 100 receive ...rnings." A "warning" constitutes notice to the student that he must consult ...nstructor and his adviser at the earliest opportunity. "Warning periods" are ...ished during the seventh and eighth weeks of thirteen-week courses, and ...g the third and fourth weeks of six and a half week courses.

...ATION

...dergraduate Probation in the School of Government and Business Ad...ration.—A student must maintain a quality-point index of at least 2.00 ... placed on probation.

... student who has attempted 12 or more semester hours of work and whose ...ative quality-point index is below 2.00 is placed on probation for the pe... n which he attempts 12 additional semester hours of work. If his quality-...ndex is still below 2.00 at the end of his probationary period, he is sus...ded.

...dergraduate Probation in Columbian College of Arts and Sciences.—A ...t who is not suspended or on probation is considered to be in good ...ng. A student* who in one semester receives two grades of *F* in courses ...g 3 or more semester hours of credit each, or the equivalent, is placed ...robation. A student in his first semester on probation who receives one ... of *F* in such a course will be continued on probation for a second semes... Two grades of *D* will be treated as equivalent to one grade of *F* in deter...g probation. Any grades of *D* or *F* replacing earlier grades of *I* will be ...ered a part of the record for the semester during which the *I* is removed. ...dent on probation taking 12 or more semester hours whose grades are all ... better is removed from probation.

* Rules governing probation and suspension are applicable as stated to students enrolled for a ... program (12 semester hours or more) during the fall or spring semester. Students enrolled ... than 12 semester hours during the fall or spring semester and students enrolled during the ... sessions are subject to probation or suspension on the basis of their record for 12 semes..., or multiples thereof, rather than on their record in any one semester.

Graduate Probation in the School of Government and Business Administration.—A student who has attempted 6 or more semester hours and whose quality-point index is below 3.00 is placed on probation for the period in which he attempts 12 additional semester hours of work. If his quality-point index is still below 3.00 at the end of his probationary period, he is suspended. If after probation is removed, a student's quality-point index again falls below 3.00, he is suspended.

SUSPENSION

Undergraduate Suspension in the School of Government and Business Administration.—A student who has attempted 12 or more semester hours of work and whose cumulative quality-point index is below 1.50 is subject to suspension.

Undergraduate Suspension in Columbian College of Arts and Sciences.—A student* who in one semester receives grades of *F* in three courses carrying 3 or more semester hours of credit each, or the equivalent, is suspended. A student in his first semester on probation who receives two or more grades of *F* in such courses is suspended. A student who receives one or more grades of *F* in such courses in any later semester on probation is suspended. Two grades of *D* will be treated as equivalent to one grade of *F* in determining suspension. Any grades of *D* or *F* replacing earlier grades of *I* will be considered a part of the record for the semester during which the *I* is removed.

An undergraduate student who is subject to probation for the third time, whether successive or after an interval, is suspended.

An undergraduate student suspended for poor scholarship cannot register for courses even as an auditor. He may apply for readmission after the lapse of either the fall or the spring semester. He must then submit evidence to the Committee on Scholarship that he is better qualified to pursue college work. A student suspended twice for poor scholarship will not be readmitted.

Graduate Suspension in the School of Education.—A student who receives the grade of *C* in more than 6 semester hours of work is subject to suspension. A student who receives a grade of *F* must confer with the Dean of the School of Education before enrollment for further work.

CHANGES IN PROGRAM OF STUDIES

DROPPING A COURSE OFF CAMPUS

A course may be dropped without academic penalty *during the first third of the semester.* Withdrawing from a course without academic penalty after the first third of the semester requires approval of a written request, *accompanied by a completed drop slip,* addressed to the Dean of the College of General Studies.

Procedure for Dropping Courses.—An off-campus drop slip (obtainable from

---

* The rules governing probation and suspension are applicable as stated to students enrolled in a full-time program (12 semester hours or more) during the fall or spring semester. Students enrolled for less than 12 semester hours during the fall or spring semester and students enrolled during summer sessions are subject to probation or suspension on the basis of their record for 12 semester hours, or multiples thereof, rather than on their record in any one semester.

he instructor, or University representatives at the College of General Studies) ust be completed, signed and dated by the instructor, and submitted to the ollege of General Studies. The effective date will be the date the instructor igned the drop slip.

Failure to follow the proper procedure will result in the Office of the Regis- ar recording the grade of *F* and, regardless of the time of discontinuance, will ot relieve the student of financial responsibility for the entire course.

ROPPING A COURSE ON CAMPUS

campus drop slip (available at the Office of the Registrar) must be completed, gned and dated by the instructor, and submitted to the Office of Student Rec- s, College of General Studies.

Each college and school of the University sets deadline dates for each semes- r concerning withdrawal.

All charges for courses dropped without the approval of the dean must be aid by the student. Reporting the dropping of a course to an instructor does ot constitute an official withdrawal.

ANSFER WITHIN THE UNIVERSITY

ansfer of residence to the College of General Studies, as a degree candidate, om another college, school, or division of the University may be made only the approval of the deans concerned. Applications for transfer are avail- at the University's Office of Admissions or at the office of the appropriate . Upon transfer the student should consult his faculty adviser as to the re- ements he must fulfill.

A maximum of 42 semester hours is transferrable toward the Associate in s in General Studies degree; a maximum of 90 semester hours is trans- rable toward a Bachelor's degree; a maximum of 12 semester hours is trans- rable toward a Master of Science in Administration degree; and a maximum semester hours is transferrable toward the degree of Master of Arts in Spe- al Studies, Master of Science in Forensic Science, or Master of Science in the residence requirements of the degree sought.

DIT

it toward a degree is given only after registration for and satisfactory com- on of the required work of courses in the University, or upon the granting dvanced standing in accordance with the regulations of the College.

or transfer from credit to audit status, see page 24.

ANCE SHEET

request, the Registrar will issue to undergraduate degree candidates a bal- sheet showing the amount of work completed and the requirements remain- to be met for the degree. A second balance sheet will be issued only in the the student changes major or degree objectives.

SCRIPTS OF RECORD

al transcripts of student records will be issued on written request of the nt or former student who has a clear financial record. A fee of two dollars rged for each transcript.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until all de-
gree requirements are satisfied (for "Leave of Absence" exception granted
by the Graduate School of Arts and Sciences, see page 64). Students who
have completed course registration (including the thesis) must maintain con-
tinuous registration by paying the "continuous registration" fee (see page 26).
By failing to register for one semester or more, the student breaks his registra-
tion and must be readmitted (see "Readmission," page 23). A "Readmitted
Student" is required to satisfy the curriculum requirements existing at the time
of his readmission. The maintaining of continuous registration normally is
limited to a period of one year.

Students must be registered during the summer if they are taking courses, are
taking required examinations, are receiving guidance toward theses or disser-
tations, or are expecting to graduate at the end of the Summer Sessions.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of
active duty, upon presentation to his dean of a copy of his orders and a petition
for such leave. The maintenance of "continuous registration" is not required of
the student on military leave; however, he must apply for readmission to the
University well in advance of the semester in which he expects to return. Pay-
ments for tuition and fees which are not refunded to the student at the time he
is granted military leave will be maintained as a deferred credit for his account
and use upon return to the University.

GRADUATION REQUIREMENTS

To be recommended for graduation a student must have met the admission re-
quirements of his college or school; completed satisfactorily the scholarship, cur-
riculum, residence, and other requirements for the degree for which he is regis-
tered; and be free from all indebtedness to the University. Registration, either
for course work or on the "continuous registration" fee basis, is required for the
semester or summer session immediately preceding the awarding of the degree.
A letter concerning degree completion is sent to military files upon request.

Application for Graduation.—An "Application for Graduation" form must be
filed and the appropriate fee paid at the time of registration for the last semester
or summer session of the senior or final year. Students completing degree re-
quirements during the Summer Sessions will be awarded diplomas (no ter-
convocation) September 30, *provided* they have completed all degree require-
ments and have applied for graduation as a part of registration for the Summer
Sessions.

Scholarship.—The student must meet the scholarship requirements for the
particular degree for which he is registered.

Curriculum.—See the requirements for the degree concerned.

Residence.—A student is "in residence" only when registered for course work
after filing formal application for degree candidacy or for the 15 semester hours
undertaken to qualify for degree candidacy, (see the specific residence require-
ments for the degree concerned).

With the permission of the appropriate dean, a student may be granted leave
of absence; such student should, however, remain technically in residence by
paying the continuous registration fee for each semester he is absent (for

ception granted by the Graduate School of Arts and Sciences, see page 64). For the purpose of this regulation, the summer session is disregarded.

Except for Master's degree candidates in the Graduate School of Arts and Sciences, the School of Education, and the School of Engineering and Applied Science, service personnel who receive military transfers when they are within 6 hours of a degree may, by special arrangements, be permitted to complete their work elsewhere, transfer these credits to the College of General Studies, and receive a degree from this University. This procedure does not apply to Master's candidates who have been granted 6 hours of transferred credit or have not completed the required courses.

Attendance and Conduct.—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

*Thesis**.—A thesis, submitted in partial satisfaction of requirements for the Master's degree, must be submitted in its final form to the appropriate dean no later than the date specified in the calendar. Two complete copies of each thesis are required. It is the responsibility of the candidate for a graduate degree to obtain from the College of General Studies a printed copy of the regulations governing the styling and reproduction of the thesis. These regulations are rigidly enforced (see page 66).

Accepted theses, with accompanying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for circulation.

Dissertation.—A dissertation, submitted in partial satisfaction of requirements for the Doctor of Science degree, must be submitted in its final form to the appropriate department of the School of Engineering and Applied Science no later than the date specified in the Calendar. It is the responsibility of the candidate to obtain a printed copy of the regulations governing the styling and reproduction of the dissertation (see page 77).

HONORS

Dean's List.—To be eligible for inclusion on the Dean's List, a student must be a candidate for an undergraduate degree in Columbian College of Arts and Sciences or the School of Government and Business Administration. Course work taken while the application for admission is being processed will be computed in determining eligibility for the Dean's List. A full-time degree candidate in the School of Government and Business Administration programs must have a minimum quality-point index of 3.50 for the semester concerned; a part-time degree candidate must have a quality-point index of 3.50 on the last 12 semester hours of work and must have maintained continuous registration for at least one three-hour course during the period concerned. Eligibility for inclusion again will be determined on the basis of the subsequent 12 semester hours of work. In Columbian College of Arts and Sciences degree programs, a student must have received grades of *A* in at least 60 per cent of the last 15 semester hours of work and no grades below *B* for that semester.

With Distinction.—The undergraduate degrees may be conferred "With Distinction," at the discretion of the Dean's Council of the College and the Com-

*Applicable only to programs in the School of Government and Business Administration. See pages 61 for *Thesis* in the School of Engineering and Applied Sciences, page 61 for *Thesis* in the School of Education.

mittee on Scholarship if a student meets the following qualifications: in th School of Government and Business Administration he must attain a quality- point index of 3.50 or higher on all work taken at this University, or in Colum- bian College of Arts and Sciences programs he must have received grades of in at least 60 per cent of the courses taken at this University.

To be eligible for this honor a student must have completed at this Univer sity at least one-half of the course work required for the degree.

Special Honors.—Special Honors may be awarded to any member of the graduating class for outstanding achievement in the student's concentration; e work on recommendation of the major department. The student must fulfi the following requirements:

1. The student must have candidacy for Special Honors approved by the faculty member representing the major department or concentration no later than the beginning of the senior year.

2. The student must meet such other conditions as may be set at the time candidacy is approved.

3. The student must have completed at this institution at least one-half of the courses required for the degree.

4. The student must fulfill the specific requirement of the college or school in which he is registered, as follows: (a) Columbian College of Arts and Science —attainment of the grades of *A* or *B* in 50 per cent of the courses taken at this institution; or (b) the School of Government and Business Administration— maintain a quality-point index of at least 3.00 on all course work taken at this institution.

DISHONESTY

The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. Although all members of the com- munity are expected to exhibit honesty and competence in their academic work, incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and tak- ing examinations.

Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate fail- ure to act in accordance with such procedures will be considered academic dis- honesty. Acts of academic dishonesty are a legal, moral, and intellectual of- fense against the community and will be prosecuted through the proper uni- versity channels.

Copies of the University policy on academic dishonesty can be obtained from the following offices: all department chairmen, all academic deans, and the Vice President for Academic Affairs.

THE LIBRARY

A student registered in the College of General Studies is entitled to the use of the University Library. Its stacks are open, and all students are welcome to browse at their leisure. A permit form for library privileges is issued to each student. A borrower's card may be obtained by presenting the permit form at the circulation desk of the Library.

The loan period for stack books is 14 days. A fine of 25 cents is charged for each day a book is overdue. Any book which circulates is subject to recall by

the Library if needed for reserve or other use. Reserve books must be used in the reserve reading room when the Library is open, except that they may be withdrawn for overnight use beginning at 8:30 p.m. A fine of 50 cents is charged for each hour or fraction thereof that a reserve book is overdue. Grades of a student are withheld until his library record is clear.

All students using the University Library are expected to be familiar with its detailed regulations, available at any of the Library's service desks.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 172–74) contains regulations recently approved by the University's Board of Trustees.

UNIVERSITY POLICY ON RELEASE OF STUDENT INFORMATION

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions which are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must:

1. Afford students access to education records directly related to them;
2. Offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate; and
3. Receive the student's written consent before releasing information from his or her education records to persons outside the University, except for directory information as indicated below. Personally identifiable information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency.

The University will release the following directory information upon request: address; telephone number; dates of attendance; school, college, or division of enrollment; field of study; credit hours earned; degrees earned; and honors received. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar.

University guidelines on the release of student information may be obtained in the Office of the Registrar.

Student Services

HONOR SOCIETIES

Alpha Sigma Lambda.—A National honor society for part-time evening college and off-campus undergraduate degree students, the purpose of which is to recognize and to encourage scholarship and leadership among undergraduate degree candidates. Membership is limited to students who have been enrolled for four semesters or terms in the College of General Studies and have completed 30 semester hours of work toward a degree with a 3.50 average, or equivalent. The Alpha Alpha Chapter was established at George Washington University in 1965.

Phi Beta Kappa.—Undergraduate degree candidates in the College of General Studies programs are eligible for membership in Phi Beta Kappa, national scholarship honorary society. The society recognizes "outstanding intellectual capacity well employed" in the field of liberal arts and sciences. Senior and junior students who are candidates for the degree of Bachelor of Arts, Bachelor of Science, or Bachelor of General Studies in Columbian College, and who have shown broad cultural interests, distinguished scholarly achievement, high character, general promise, and scholarly ideals may, to a number not exceeding 1 per cent of a class, be elected to membership by the faculty members of the Alpha Chapter of the District of Columbia. Seniors and juniors in other schools of the University who meet the above requirements are also eligible for consideration for membership, provided that their program of studies includes appreciable work in the liberal arts.

COUNSELING

Students in the off-campus programs may obtain educational counseling and assistance in program planning through the Office of Counseling and Information Services or from University representatives at the various off-campus centers. The Office of Counseling and Information Services coordinates student personnel services, including adult academic counseling, vocational guidance as related to educational programs, and liaison with other University departments and services, as well as serving as a resource center for information on tuition assistance available to students in the College of General Studies programs. Appointments may be made by calling the College of General Studies, telephone extension 7069, or through the Education Director at locations where courses are scheduled. University counselors are also available at all locations during announced registration periods and at scheduled times each month.

UNIVERSITY BOOKSTORE

Textbooks may be ordered by mail from the University Bookstore. Forms for this purpose are available at registration. The hours of the Bookstore will be announced in the *Schedule of Classes.*

The Bookstore is located in the Cloyd Heck Marvin Center, 800 21st Street N.W.; telephone 676-6870.

VETERANS EDUCATION

The Office of the Registrar, Luther Rice Hall, 2121 Eye Street, N.W., assists students entitled to educational benefits as veterans or war orphans with

problems which may arise concerning their benefits. This Office also processes ertifications of enrollment and attendance to the Veterans Administration so hat monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should onsult the Office of the Registrar prior to submitting application to the Vet-rans Administration. All such students should obtain the instruction sheet ued by the Office of the Registrar, which sets forth requirements to be lfilled before certification of enrollment can be made to the Veterans Admin-ration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 0421.

TUDENT AND ALUMNI CAREER SERVICES OFFICE

he Student and Alumni Career Services Office, Woodhull House, 2033 G treet, N.W., provides assistance to students and alumni seeking full-time, part-me, temporary, or permanent employment.

Counseling concerning trends in employment, areas of employment, various er and examination announcements, preparation for job interviews, resume-iting, and other procedures for successful job application are always avail-le. Specific career openings; an on-campus recruitment program by business, dustry, government, and school systems; volunteer opportunities; and part-me and temporary jobs for students while attending school are all part of this rvice. Teacher credential files initiated by persons seeking employment in all ucational fields are maintained in this Office.

An understanding and knowledgeable approach to avenues of service for ose people who do not find career satisfaction in the structured systems of siness, government, and education is also provided in the Student and Alumni reer Services Office.

Continuing Education for Women

ANY WOMEN wish to resume or continue their education on a part-time is. They feel the need to return to the classroom to update their education, pare for new careers, qualify for job promotion, participate more effectively ommunity affairs, or enrich their own lives through a sense of personal th. The Continuing Education for Women program, which originated in 6, is designed to meet these needs. More than 5,000 women have been as-d with their goals during a 10-year period.

ntinuing Education for Women offers (1) Counseling Services (day and ning): Developing New Horizons for Women, Career Development for Em-ed Women, Career Planning for Young Women, Seminar on the Status of s-Female Relationships, and Individual Counseling; (2) off-campus credit ses at hours and locations convenient for women; (3) selected daytime and ng noncredit courses; (4) academic advising for women entering degree ondegree programs; (5) a Legal Assistant Training Program; (6) a Land-e Architect Assistant Program; (7) an Editing and Publications Program; an Office Administrator Program; and (9) specially designed courses for ess and government agencies.

DEVELOPING NEW HORIZONS FOR WOMEN

Developing New Horizons for Women is offered both day and evening each semester to help women to gain confidence in their abilities; to become acquainted with educational, occupational, and community service opportunities; and to establish goals. There are no prerequisites for this course. Participants range in age from 18 to 78 and in educational background from those with no previous college education to those who have earned graduate degrees. Approximately one-half have earned bachelor's degrees.

This 14-week noncredit course includes lectures, group discussions, guest speakers, psychological testing, and individual counseling. Participants attend class once a week for 2½ hours. This course has been held on campus as well as in suburban Virginia and Maryland locations. All groups meet on the University campus for two guest speaker sessions.

CAREER DEVELOPMENT FOR EMPLOYED WOMEN

Career Development for Employed Women emphasizes the exploration of (1) opportunities for upward mobility in current occupation; (2) possible new careers in related fields; (3) the risks and rewards of changing to an entirely different career. Each student will be assisted in assessing her own abilities and interests and in relating this information to educational opportunities and career outlook. Included will be testing; group and individual counseling, lectures, and some independent study. There are no prerequisites for this course.

Classes meet once a week from 7 to 9:30 pm on the University campus and at locations in Virginia and Maryland.

CAREER PLANNING FOR YOUNG WOMEN

A counseling program designed to meet the special needs of students in the last two years of high school or their first two years in college. Since women are being offered more options, not only in occupations considered "traditional" for women but also in new and unusual fields, and since statistics show that women spend an increasing number of years in the labor force, the choice of a career merits careful consideration and an objective analysis of advantages and drawbacks.

The course offers assistance in exploring career opportunities, choosing an appropriate educational curriculum, developing effective study skills, and learning job-finding techniques. Individual counseling and group interaction encourages each young woman to plan both immediate and future goals.

Sessions will be arranged at times and locations convenient for enrollees.

INDIVIDUAL COUNSELING

For some persons, the group programs may not be convenient. An individually planned counseling program including a battery of tests, independent study, and interviews can be arranged. Counseling is on a one-to-one basis: *tuition* is $125. This program is available by appointment only. For information on individual counseling call 676-7036.

DAY-TIME OFF-CAMPUS CREDIT COURSES

To enable women to continue their formal education Continuing Education for Women offers credit courses off campus at hours and locations convenient

women. Classroom space has been provided by churches and community cen-
ers in Alexandria, Arlington, Annandale, Falls Church, McLean, and Spring-
field, Va.; Bethesda, Chevy Chase, Kensington, and Rockville, Md.; as well as
the District of Columbia.

Except for Education courses, which meet for 3 hours a week, each under-
graduate course meets once a week for 2½ hours during the morning or early
afternoon. Although many women take these courses to meet requirements for
degree programs, students may also be accepted in a nondegree status. Many
women who complete credit courses as nondegree students are encouraged to
apply for degree candidacy at George Washington University. Other women
need only specific courses to qualify for positions in business or government;
some who already have degrees wish to qualify for professional certification.
Many students in this program have had credits transferred to other colleges
and universities throughout the country.

Increasingly, government and industry have been granting leave for em-
ployed women to enroll in daytime credit courses, particularly where the
courses are job-related.

NONCREDIT COURSES

Selected noncredit courses are offered through Continuing Education for
Women, taught by academically qualified instructors. Courses offered have
included *Introduction to Library Science; Writing and Illustrating Children's
Books; Creative Thinking and Problem-solving; Oral History Workshop; A
Business of Your Own; How to Study; Mathematics Refresher; Commercial
Writing; Assertiveness Training for Women; Conferences: Large or Small;
LSAT Review; Introduction to Landscape Architecture; Surviving Separation
and Divorce; Writing Fiction; Equal Employment Opportunity Workshop;
Graduate School Admission Test Review; The Socratic Circle;* and *Workshop in
Dynamic Oral Communication.*

SPECIAL PROGRAMS

LEGAL ASSISTANT PROGRAM

During the fall of 1972, Continuing Education for Women, in cooperation with
the George Washington University National Law Center, initiated the Legal
Assistant Training Program. This one-year graduate-level academic Program
prepares men and women to assist lawyers in research, writing, and other out-
of-court functions. For admission to the Program, an applicant must have a
bachelor's degree or the equivalent in education or experience, and must suc-
cessfully complete required tests. For a special brochure giving details of this
program, telephone 676-7036.

LANDSCAPE ARCHITECT ASSISTANT PROGRAM

A 12-month non-credit course in landscape and environmental design was ini-
tiated during the spring of 1974. This graduate-level Program concentrates on
drafting and design, and includes a survey of plant materials as well as lectures
on the varied aspects of the professional's work, providing the student with
high-quality training and marketable skills in this career field. A Certificate
will be awarded on the satisfactory completion of the Program. Classes are
open to both men and women and are taught by professional landscape archi-

tects and horticulturists. For admission to the program an applicant must ha
a bachelor's degree. For further information and a brochure, telephone
7036.

EDITING AND PUBLICATIONS PROGRAM

A graduate-level, noncredit training program in editorial and publishing
cedures began in January 1974. The program provides men and women
the practical skills needed for careers in the publications field. It takes one
to complete. A Certificate will be awarded upon the satisfactory completion
the Program. The main areas of study are (1) editing and copywriting
printing, layout, and design. Summer seminars in specialized subjects
planned. For admission to the program, an applicant must have a bachelo
degree. For information and a brochure, telephone 676–7036.

OFFICE ADMINISTRATOR PROGRAM

This comprehensive 12-month certificate program is designed for persons
ing to advance in their present job or for those who wish to enter the busin
world at a managerial level. Included in the training are courses in supervi
and staff development, oral and written communication, human relations,
cision-making techniques, computer processing, financial records and analy
report writing, organizing and directing conferences, and the preparation
grant and budget proposals.

Instructors are business professionals. Guest speakers from the busin
management field will present lectures. The program is open to women
men with office skills background. A college degree is desirable but not
quired. For information, telephone 676-7036.

ACADEMIC ADVISING

The professional staff of Continuing Education for Women advises wo
interested in enrolling in off-campus degree and nondegree programs. Ref
are also made to colleges, schools, and departments of the University on
pus, depending upon the goals of the individual student. Counselors are
able at dates and locations indicated for registration. Appointments can
be made for individual or group academic advising at the Office of Con
Education for Women, 2130 H Street, N.W., Washington, D.C. 20052

PROGRAM DEVELOPMENT

Eleven years of experience in creating and conducting successful progra
meet needs of women has made the staff of Continuing Education for Wo
uniquely qualified to design special programs for women in business or
ernment.

The Continuing Education for Women program was originated for wo
However, men are welcome to enroll in credit and noncredit courses. For
ther information telephone 676-7036 or write to Continuing Education
Women, George Washington University, 2130 H Street, N.W., Washing
D.C. 20052. Descriptive brochures are available.

MASTER OF ARTS IN SPECIAL STUDIES

A Master of Arts in Special Studies degree with an area of concentration in Women Studies is offered by the Graduate School of Arts and Sciences. This interdisciplinary program prepares students for professional careers in (1) supervision and management; (2) counseling and career development; (3) teaching in Women Studies; and (4) research related to women.

For further information, contact Dr. Ruth H. Osborn, Assistant Dean for Continuing Education for Women, and Coordinator of the Committee on Women Studies, telephone 676-7035.



DEGREE PROGRAMS

Undergraduate Degrees

THE FACULTY of Columbian College of Arts and Sciences has academic jurisdiction over the degrees of Associate in Arts in General Studies; Bachelor of General Studies with areas of concentration in History, Mathematics, Political Science, Psychology, and Sociology; Bachelor of Science in Geodetic and Cartographic Science; and Bachelor of Science in Oceanography. The Faculty of the School of Government and Business Administration has academic jurisdiction over the degree of Bachelor of Science in Administration with areas of concentration in Accounting and Business Administration. The School of Medicine and Health Sciences has academic jurisdiction over the degree of Bachelor of Science in the field of Environmental Health. These off-campus programs are administered by the College of General Studies.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and "Undergraduate Degree Candidacy," pages 17–20.

INCOMPLETE/AUTHORIZED WITHDRAWAL

Conditions under which the grades of *I* (Incomplete) or *W* (Authorized Withdrawal) may be assigned are described on page 32.

Removing an Incomplete.—In Columbian College of Arts and Sciences and the School of Government and Business Administration the grade of *I* must be removed no later than the last day of the examination period for the next spring semester immediately following the semester or summer session in which the grade of *I* is assigned. An "Incomplete" that is not removed within this period is automatically changed to an *F*. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the appropriate dean, or the appropriate committee, for additional time in which to complete the work of the course. Such petitions should be submitted within the same period.

REQUIREMENTS FOR THE ASSOCIATE IN ARTS IN GENERAL STUDIES DEGREE

RESIDENCE

The last 18 semester hours in the Associate in Arts in General Studies degree program must be completed in residence as a candidate for this degree. A portion of the academic work taken to qualify for degree candidacy (see page) may be accepted in partial satisfaction of the residence requirement, if the courses are approved as part of the student's degree program.

REQUIREMENTS FOR THE BACHELOR'S DEGREES

RESIDENCE

The last 30 semester hours, including at least 12 hours in the area of concentration, must be completed in residence as a candidate for the degree sought, unless special permission is granted by the appropriate dean to take work elsewhere. This requirement applies to students transferring within the University as well as to students transferring from other institutions. The 15 hours taken in order to be considered for degree candidacy may be counted in residence. For regulations governing military students who are transferred when they are within 6 semester hours of their degrees, see pages 36–37.

Transfer students to the School of Government and Business Administration who have 90 semester hours of approved transfer credits from another college or university and who need only the 30-semester-hour minimum to complete degree requirements *must* plan their program of study with a faculty adviser before registering for the first course.

In no case will credit for more than 15 semester hours of undergraduate course work taken as a nonmatriculated student at this University be allowed toward meeting degree requirements without prior admission as a degree candidate for the Bachelor of Science in Administration program.

Transfers.—Transfer students from other colleges or universities must complete satisfactorily at least 12 semester hours of the required work in their area of concentration in residence as a candidate for the degree sought.

ASSOCIATE IN ARTS IN GENERAL STUDIES

Faculty Adviser: John H. McCalla, College of General Studies; Building F, Room 14, Telephone 676-7016.

On the satisfactory completion of the requirements set by Columbian College of Arts and Sciences, the degree of Associate in Arts in General Studies is conferred. Students who plan to continue working toward an off-campus Bachelor's degree offered by Columbian College must apply to the Dean upon completion of the requirements for the degree of Associate in Arts in General Studies. Forms for this purpose are available at the College of General Studies.

After completing the requirements for the degree of Associate in Arts in General Studies, students may wish to transfer to an on-campus degree program within the University, or they may wish to transfer to another institu-

tion. However, modifications in admission, advanced standing, and curricular requirements permitted in the Associate in Arts in General Studies degree program may not be accepted in transfer. Therefore, while registered for the degree, students should meet the requirements of the college, school, or university to which they wish to transfer. The entrance requirements of the colleges and schools of the University are stated in this catalogue and in the *Undergraduate and Graduate Catalogue* of the University.

Scholarship.—The system of grading is described on pages 31–32. For regulations concerning probation, suspension, and readmission, see pages 33–34.

CURRICULUM

The satisfactory completion of 60 semester hours of college work in the following curriculum is required. Students who plan to pursue a Bachelor's degree are advised to plan their Associate's program so that they will satisfy the prerequisites to the degree of their choice.

	Semester Hours
Communications	
Engl 9 or 10, 11	6
SPDR 1, 11, 111, or 121	3
Humanities	
Nine semester hours selected from the following: Art 31–32, 71–72; Engl 43–44, 45–46, 51–52, 71–72, 91–92; Mus 3, 4; Phil 50; Rel 9, 10, 59–60	9
Natural and Mathematical Sciences	
Nine semester hours selected from the following: BiSc 3–4, 11–12; Chem 3–4, 5–6; Geol 1–2, 3, 4; Math 3, 6, 9, 10, 30, 31, 51, 52; Ocea 101, 102; Phys 1, 2, 9–10; Stat 51, 101–2	9
Social Studies	
Nine semester hours are required, each course chosen from one of two departments, selected from the following: AmCv 71–72; Anth 1–2; Econ 1–2; Geog 51 and 52; Hist 39–40, 71–72; PSc 4 or 5, 6; Psyc 1, 8, 22, 29; Soc 1, 2	9
Elective	24
Total	60

BACHELOR OF GENERAL STUDIES

Faculty Adviser: John H. McCalla, College of General Studies; Building F, Room 14, Telephone 676-7016.

The Bachelor of General Studies curriculum aims to provide the adult part-time student with the opportunity to obtain a broad education. For that reason, the course work required in the first and second years is distributed among Communications (written and oral), the Humanities, Natural and Mathematical Sciences, and the Social Studies. In choosing the third- and fourth-year courses of work required in departments related to their concentration, students should obtain counseling through the faculty adviser.

Students planning to work toward Master's degrees are advised to plan their Bachelor's programs so that they will meet the prerequisite requirements of the school or college of their choice. Students planning to enter graduate programs which require a reading knowledge of a foreign language are advised to include two years of one foreign language in their Bachelor's program.

Scholarship.—To qualify for graduation 120 hours of course work must be passed and an index achieved of 2.00 based on courses passed with grades of *A, B, C,* or *D*. The index is obtained by dividing the number of quality points by the number of semester hours of courses the student submits for graduation with grades of *A, B, C,* or *D*, both based on his record at this University. The index is computed from grades as follows: *A*, four points; *B*, three points; *C*, two points; *D*, one point, for each semester hour for which the student has registered. Courses marked *F, W, I, NC,* or *CR* are not considered in determining the index. (When a formal grade is recorded for an Incomplete, a grade of *D* or better will be included in the computation of the index.) Grades in courses taken at another institution are not considered in computing the index.

Students must also achieve no lower than the grade of *C* in the minimum number of 100 level (or above) courses required in the selected area of concentration. *D* in a required course will satisfy a curricular requirement in the area of concentration and may count toward the total 120 hours, but it shall not count toward the minimum number of hours required in the area of concentration.

The system of grading is described on pages 31–32. For regulations concerning probation, suspension, and readmission, see pages 33–34.

FIRST AND SECOND YEARS

Communications

	Semester Hours
Engl 9 or 10, 11	6
Engl 20	3
SPDR 1, 11, 111, or 121	3

Humanities*

Twelve semester hours selected from the following: Art 31–32, 71–72; Engl 43–44, 45–46, 51–52, 71–72, 91–92; Foreign Language (2 years of one language); Mus 3 and 4; Phil 50; Rel 9 and 10, 59–60; Slav 91–92..... 12

Natural and Mathematical Sciences

Six to eight semester hours selected from the following: BiSc 3–4, 11–12; Chem 3–4, 5–6; Geol 1–2, or 3 and 4; Ocea 101, 102; Phys 1 and 2, or 21–22..... 6–8

Six semester hours selected from the following: Math 3, 6, 9, 10, 30, 31, 52; Stat 51, 53, 101–2..... 6

Social Studies

Twelve semester hours selected from two of the following combinations: Anth 71–72; Anth 1–2; Econ 1–2; Geog 51 and 52; Hist 39–40; Hist 71–72; PSc 4 and 6; PSc 5 and 6; Psyc 1 and 8; Psyc 1 and 22; Psyc 1 and Soc 1 and 2..... 12

*Students who plan to continue study for advanced degrees are urged to fulfill the 2-year language

	Semester Hours
Elective (depending on science option)	10–12
	60

THIRD AND FOURTH YEARS

Concentrations are offered in Economics, History, Mathematics, Political Science, Psychology, and Sociology.

Concentration Requirements (to be selected in consultation with the faculty adviser):	24*
100-level courses in the department of the selected area of concentration	18*
100-level courses in two or more related departments	18
Elective	60
Total	120

BACHELOR OF SCIENCE IN ADMINISTRATION

Academic Advising: Information and Advising Center, Government 105, Telephone 676-7027.

The Bachelor of Science in Administration curriculum aims to provide the adult part-time student with the opportunity to obtain a broad education in preparation for careers in accounting or business administration. Students should obtain both general educational counseling and specific area of concentration advising when initially considering their curriculum. A conference concerning curriculum planning for courses to be taken as a degree candidate is *required* of each applicant *before* admission to degree candidacy. The course work required in the first and second years is a general curriculum for both the Accounting and Business Administration concentration. The course work required for the third and fourth years is chosen from either the Accounting or Business Administration area of concentration curriculum. In choosing the third- and fourth-year course work required in departments related to the concentration, students should obtain counseling through the appropriate departmental faculty adviser. Except for Acct 115, 121, and 191, no student may receive credit for courses in Accounting and Business Administration numbered *above the 100-level* unless third-year (junior) standing has been attained. Also, an exception is made for those 100-level courses (BAd 102, 105, and Mgt 118) specifically approved by the School of Government and Business Administration which are taken in the program of study leading to the degree of Associate in Arts in General Studies. Students who elect BAd 102, 105, and Mgt 118 while enrolled in the Associate in Arts in General Studies degree program will receive *elective* credit for these courses if they transfer to the Bachelor of Science in Administration degree program as juniors. However, an additional course in each of the three areas covered by these courses must be taken.

* Students selecting Psychology or Sociology as an area of concentration are required to take semester hours of 100-level Psychology courses (for the Psychology area of concentration) or Sociology courses (for the Sociology area of concentration) and 24 semester hours of 100-level courses in two or more related departments.

fulfill the core requirements of the degree of Bachelor of Science in Administration. The course work for all four years is described on the following pages. Students are reminded that Accounting and Business Administration courses ken at accredited 2-year colleges may be applied toward the degree of Bache- of Science in Administration provided they are comparable to below 100- el courses required in the first and second years of the curriculum.

Students planning to work toward Master's degrees are advised to plan their chelor's programs so that they will meet the entrance requirements of the hool or college of their choice.

HOLARSHIP

e system of grading and computing scholarship is described in detail on ges 31–32. For regulations concerning probation, suspension, readmission, pages 33–34.

To graduate, a student must have the following: (1) a general quality-point ex of at least 2.00 and (2) a quality-point index in the area of concentra- n of at least 2.00. All courses in the Bachelor of Science in Administration a of concentration are to be included in the quality-point index cal- on. Elective courses in or out of the School of Government and Business ministration cannot be used as substitutes in the major quality-point index ulation.

COUNTING AND BUSINESS ADMINISTRATION CURRICULUM

ST YEAR

	Semester Hours
ounting	
ct 1–2	6
lish Composition	
gl 9 or 10, 11	6
ree	
to eight semester hours selected in consultation with the adviser from following: BiSc 3–4; Chem 5–6; Geog 51 and 52; Geol 1–2, or 3 and 4; ys 1 and 2, or 3 and 4, or 9–10	6–8
al Studies	
on 1–2	6
tive (to be selected in consultation with the adviser from courses other n those in Accounting, Business Administration, and Economics)	4–6
	30

ND YEAR

ess Administration	
d 51	3

Art, Literature, Language, Music, and Philosophy*

Six semester hours selected in consultation with the adviser from the following: Art 31; Engl 43–44, 45–46, 51–52, 71–72, 91–92; Foreign Language (1 full year of a foreign language); Mus 3; Phil 50

Mathematics

† Math 31 and 32, or 51 and 52

Social Studies

Psyc 1, 8

Six semester hours selected in consultation with the adviser from the following: Anth 1; Hist 71–72; PSc 4 or 5, 6; Soc 1

Statistics

Stat 51 or 101

ACCOUNTING CONCENTRATION CURRICULUM

THIRD YEAR

Acct 101:	Cost and Budgetary Control
Acct 121:	Intermediate Accounting
Acct 161:	Federal Income Taxation
Acct 191:	Advanced Accounting
BAd 102:	Fundamentals of Management
BAd 131:	Business Finance
BAd 141:	Basic Marketing Management
BAd 161:	Commercial Law
Mgt 118:	Introduction to Information Processing
Elective:	(Three semester hours selected in consultation with the adviser from 100-level courses in Accounting, Business Administration, or Economics)

FOURTH YEAR

Acct 132:	Accounting Theory
Acct 171:	Auditing
Acct 181:	Accounting Systems
BAd 101:	The Business Environment
BAd 181:	Manufacturing Production
BAd 198:	Business Policy and Administration
Econ 121:	Money and Banking
Stat:	Three semester hours selected in consultation with the adviser from the following
Stat 111:	Business and Economic Statistics I
Stat 155:	Introduction to Probability

* Students selecting Accounting as an area of concentration may postpone this 6-hour requirement until the third year if they wish to elect Acct 121 and 191 in the second year.

† Math 31 and 32 are recommended for those students who plan to take graduate work in quantitative methods.

		Semester Hours
Stat 187:	Theory of Sampling	
Elective:	(Three semester hours selected in consultation with the adviser from 100-level courses in Accounting, Business Administration, or Economics)	3
Elective:	(Three semester hours selected in consultation with the adviser from 100-level courses)	3
	Total semester hours	120

SINESS ADMINISTRATION CONCENTRATION CURRICULUM

IRD YEAR

Acct 193:	Business Budgeting	3
BAd 102:	Fundamentals of Management	3
BAd 105:	Personnel Management	3
BAd 131:	Business Finance	3
BAd 141:	Basic Marketing Management	3
Mgt 118:	Introduction to Information Processing	3
Elective:	(Six semester hours selected in consultation with the adviser from 100-level courses in Accounting, Business Administration, or Economics)	6
Elective:	(Six semester hours selected in consultation with the adviser from 100-level courses)	6
		30

URTH YEAR

BAd 101:	The Business Environment	3
BAd 161:	Commercial Law	3
BAd 181:	Manufacturing Production	3
BAd 198:	Business Policy and Administration	3
Econ 121:	Money and Banking	3
Psyc 144:	Personnel and Industrial Psychology	3
Elective:	(Six semester hours selected in consultation with the adviser from 100-level courses in Accounting, Business Administration, or Economics)	6
Elective:	(Six semester hours selected in consultation with the adviser from 100-level courses)	6
	Total semester hours	120

BACHELOR OF SCIENCE IN GEODETIC AND CARTOGRAPHIC SCIENCE

dy Adviser: Hyman Orlin, Professorial Lecturer in Geodesy, Cartography, and ography; Telephone 946-3557. Counseling by appointment only, Telephone 3.

ourse work in this four-year curriculum is offered on and off campus. Cartography, Geodesy, and Oceanography courses are given at the Na- Oceanic and Atmospheric Administration, the Naval Oceanographic Of- the U.S. Army Topographic Command, and at other locations not too dis- from the campus.

ance requirements are stated on pages 17–20; residence requirements are on page 47.

SCHOLARSHIP

The system of grading is described on pages 31–32. For regulations regarding probation, suspension, and readmission, see pages 33–34.

To qualify for graduation 120 hours of course work must be passed and the index achieved of 2.00 based on courses passed with grades of *A*, *B*, *C*, or *D*. Students must achieve no lower than a grade of *C* in the minimum number of 100-level or above courses required in the selected area of concentration.

CURRICULUM

Required—First Year

		Semester Hours
Cart 1:	Cartography I	
Cart 2:	Cartography II	
Engl 10:	English Composition: Language as Communication	
Engl 11:	English Composition: Language and the Arts and Sciences	
Geol 1 or 3:	Introductory Geology for Nonscience Majors	
Math 30:	Precalculus	
Math 31:	Calculus of One Variable	
Phys 1 or 3:	Foundations of Physics	
Social Studies:	To be selected from courses offered by the departments of American Civilization, Anthropology, Economics, Geography and Regional Science, History, Journalism, Political Science, Psychology, and Sociology	

Required—Second Year

Chem 11–12:	General Chemistry
Geod 12:	Plane Surveying
Geod 13:	Geodetic Surveying
Math 32:	Calculus of Several Variables
Math 33:	Calculus of Vector Functions
Stat 91:	Principles of Statistical Methods
or Stat 107:	Statistics for Engineers
Humanities:	To be selected from courses offered by the departments of Art, East Asian Languages and Literatures, English, Germanic Languages and Literatures, Music, Philosophy, Religion, Romance Languages and Literatures, Slavic Languages and Literatures, and Speech and Drama

Required—Third and Fourth Years

Geod 17:	Elementary Photogrammetry
Geod 18:	Intermediate Photogrammetry
Geod 110:	Map Projections
Ocea 101:	Oceanography I
Ocea 102:	Oceanography II
Ocea 105:	Elementary Geophysics

COURSES REQUIRED IN THE CARTOGRAPHIC MAJOR

Cart 103:	Introduction to Remote Sensing
Cart 104:	Photo-interpretation

		Semester Hours
Cart 107:	Physiography	3
Cart 108:	Climatology	3
Cart 111:	Cartographic Techniques	3
Cart 112:	Advanced Cartography	3
Cart 120:	Computer Mapping	3
Cart 130:	Techniques in Remote Sensing	3
Electives:	(Selected in consultation with the adviser)	18–19
		120

URSES REQUIRED IN THE GEODETIC MAJOR*

Cart 107:	Physiography	3
Geod 110:	Map Projections	3
Geod 117:	Advanced Photogrammetry	3
Geod 155:	Elementary Geodesy	3
Geod 156:	Geodetic Astronomy	3
Geod 160:	Adjustment Computations I	3
Geod 161:	Adjustment Computations II	3
Electives:	(Selected in consultation with the adviser)	21–22
		120

BACHELOR OF SCIENCE IN OCEANOGRAPHY*

Adviser: Hyman Orlin, Professorial Lecturer in Geodesy, Cartography, and ography; Telephone 946-3557. Counseling by appointment only, Telephone 13.

ourse work in this four-year curriculum is offered on and off campus. artography, Geodesy, and Oceanography courses are given at the Na- Oceanic and Atmospheric Administration, the Naval Oceanographic the U.S. Army Topographic Command, and at other locations not too from the campus.

ance requirements are stated on pages 17–20; residence requirements are on page 47.

OLARSHIP

ystem of grading is described on pages 31–32. For regulations concern- robation, suspension, and readmission, see pages 33–34.

qualify for graduation 120 hours of course work must be passed and an achieved of 2.00 based on courses passed with grades of *A*, *B*, *C*, or *D*. ts must achieve no lower than a grade of *C* in the minimum number 00-level or above courses required in Oceanography.

considering graduate studies should acquire a reading knowledge of either French, or Russian.

CURRICULUM

Required—First Year

Cart 1:	Cartography I
Cart 2:	Cartography II
Engl 10:	English Composition: Language as Communication
Engl 11:	English Composition: Language and the Arts and Sciences
Geol 1 or 3:	Introductory Geology for Nonscience Majors
Math 30:	Precalculus
Math 31:	Calculus of One Variable
Phys 1 or 3:	Foundations of Physics
Social Studies:	To be selected from courses offered by the departments of American Civilization, Anthropology, Economics, Geography and Regional Science, History, Journalism, Political Science, Psychology, and Sociology

Required—Second Year

BiSc 11–12:	Introduction to Biology for Science Majors
Geol 2 or 4:	Introductory Geology for Nonscience Majors
Math 32:	Calculus of Several Variables
Math 33:	Calculus of Vector Functions
Ocea 101:	Oceanography I
Ocea 102:	Oceanography II
Stat 91:	Principles of Statistical Methods
or Stat 107:	Statistics for Engineers
Humanities:	To be selected from courses offered by the departments of Art, East Asian Languages and Literatures, English, Germanic Languages and Literatures, Music, Philosophy, Religion, Romance Languages and Literatures, Slavic Languages and Literatures, and Speech and Drama

Required—Third and Fourth Years

Cart 107:	Physiography
Cart 108:	Climatology
Chem 11–12:	General Chemistry
Ocea 105:	Elementary Geophysics
Ocea 110:	Physical Oceanography
Ocea 111:	Ocean Waves and Tides
Ocea 112:	Biological Oceanography
Ocea 113:	Marine Geophysics
Ocea 114:	Chemical Oceanography
Ocea 115:	Geological Oceanography
Ocea 120:	Coastal Ecology
Electives:	(To be selected in consultation with the adviser)

SPECIAL DEGREE PROGRAMS

SERVICEMEN'S OPPORTUNITY COLLEGE (SOC)

George Washington University has been designated a Servicemen's Opportunity College (SOC). SOC provides opportunities for active duty servicemen and women to pursue educational program goals through courses offered on base, in the evenings, on weekends, and at other nontraditional time frames. In support of the concept, George Washington University, while still maintaining its normal academic standards, assumes the responsibilities of meeting the educational needs of an individual serving in the Armed Forces. Provisions have been established whereby these individual needs can be met. Specifically, individuals designated as SOC students who desire to obtain an Associate's or a Bachelor's degree from George Washington University's Columbian College of Arts and Sciences will be assured of a degree completion program through use of the agreement that follows:

AGREEMENT

George Washington University, a Servicemen's Opportunity College, agrees to the following:

1. Upon admission to Associate in Arts in General Studies or Bachelor of General Studies degree candidacy, the student may take the required course work either on or off campus. Regardless of where taken, courses of study pursued while a degree candidate may be applied toward the degree sought, as a requirement or an approved elective. Although the grade of *D* is not acceptable for transfer, it may be used to satisfy a curriculum requirement. It may not, however, be counted toward the total number of semester hours required for the degree, and it should not be repeated. Courses will be taken from George Washington University unless the serviceman is transferred to a location not served by this University. In the case of transfer and in consideration of the student's future assignment, arrangements will be made between the student and the counselor assigned to him by the College of General Studies to ensure that the courses he takes elsewhere satisfy his George Washington University program.

II. Academic credit may be obtained by any one or a combination of the following:

1. Registration as an on- or off-campus, full- or part-time student at this University.

2. Advanced standing for academic studies taken at other accredited institutions where such studies meet the requirements for the degree, or by examination. (A maximum of 42 semester hours allowed for the Associate's degree; a maximum of 90 semester hours allowed for the Bachelor's degree.)

Within the maximum of 42 hours of credit allowed for advanced standing toward the Associate in Arts in General Studies degree, a maximum of 30 hours may be obtained by any one or combination of the methods below. Within the maximum of 90 hours of credit allowed for advanced standing toward the Bachelor of General Studies degree, a maximum of 60 hours may be obtained by any one or combination of the methods below.

College-Level Examination Program (CLEP) Subject Examinations.—CLEP Subject Examinations are offered in more than 20 subject areas. These

tests measure achievement in the equivalent of specific college-level course
(Credit may not be earned by passing the examination after having taken an
equivalent course.) Maximum credit allowed for Associate's degree, 30 semes
ter hours; maximum allowed for Bachelor's degree, 60 semester hours. A can
didate for a degree from any school at this University must seek departmental
approval *prior* to taking the examination in order to receive credit for a CLEP
Subject Examination.

2. ***College-Level Examination (CLEP) General Examination.***—CLEP Gen
eral Examinations are offered in five areas: Mathematics; Social Sciences; Hu
manities; Natural Sciences; and English Composition. (Credit—advanced
standing—is not given for the General Test in English Composition.) Maxi
mum credit allowed, 24 semester hours.

3. *Columbian College of Arts and Sciences Special Departmental Examina
tions.*—A student may request any department of Columbian College to offer
him a special examination covering the subject matter of any specific course.
(If an appropriate CLEP Subject Examination is available, the department may
choose to employ it.) If a student performs satisfactorily, he may receive
credit (advanced standing), waiver of requirement, or both, at the discretion
of the department. (A student who has previously taken examinations to waive
course requirements may not, however, at a later time take examinations to gain
credit in the same courses.) Special departmental examinations will normally
be of at least three hours' duration. A fee of $25 for each course examination
is charged for preparing, administering, and grading. Maximum credit allowed
for Associate's degree, 30 semester hours; maximum allowed for Bachelor's
degree, 60 semester hours.

4. *Service Schools.*—A maximum of 30 (or a maximum of 12 hours if the
courses are "professional") semester hours may be obtained on the basis of
service schools satisfactorily completed, as evaluated in accordance with the
"Guide to the Evaluation of Educational Experience in the Armed Forces"
issued by the Committee on Accreditation of Service Experience. Ordinarily
such subjects are counted as electives. No credit will be allowed for military
experience as such.

5. *Correspondence Courses.*—A maximum of 15 semester hours may be
earned through the successful completion of correspondence courses of college
level which are offered by the U.S. Armed Forces Institute or a regionally ac
credited college or university.

III. The minimum requirement for the Associate in Arts in General Studies
degree is 60 semester hours; the minimum requirement for the Bachelor of
General Studies degree is 120 semester hours. A minimum of 18 semester hours
for the Associate's degree and a minimum of 30 hours for the Bachelor's de
gree must be completed at George Washington University, but may be com
pleted at any point in the student's program of study. At least 6 semester hours
in the selected area of concentration must be taken at this University.

IV. The College of General Studies will handle and coordinate administra
tive matters and be the point of contact with the college granting the degree.
The provisions as stated in the *College of General Studies* catalogue will apply
in all cases not specifically mentioned in this agreement.

V. Tuition and fees will be as stipulated in the *College of General Studies*
catalogue on a year-to-year basis.

VI. Students accepted under this program are subject to the probation

spension regulations of the University, and are required to maintain scholas- standards.

VII. In addition to trained counselors, University Representatives are as- ned to each installation to assist in the counseling function.

MY HELP FOR EDUCATION AND DEVELOPMENT (PROJECT AHEAD)

George Washington University is cooperating with the U.S. Army in Project EAD. The primary objective of the program is to permit affiliation of ified young persons with the University upon their entrance into the Army. e University will open and maintain an active record file and assign a coun- or to the student while he or she is in the Army. In effect The George ington University becomes his or her alma mater. The counselor helps student plan the course of study and advises which courses to pursue ng those offered on or near the base or installation. After discharge from Army, the veteran enrolls as a full-time student to complete the degree. duals designated as Project AHEAD students who desire to obtain an ate's or a Bachelor's degree from George Washington University's Colum- College of Arts and Sciences will be assured of a degree completion pro- through the following procedures:

Students who are admitted under normal rules and regulations are required gister and pay a continuous registration fee for one semester. Upon com- on of that semester students present their active duty orders and will be ed military leave for the period of active duty.

A student who is not readily admitted will be required to complete a 30 ester hour pre-qualifying program based upon the student's needs as eval- d. Upon successful completion of the program at accredited colleges or ersities, the student will receive advanced standing and be admitted as a ee candidate based upon the current catalogue at that time. After that the edure outlined above will apply.

A time limit of five years is imposed from the time of admission or com- cement of the pre-qualifying program for the student to be readmitted and nence resident requirements at The George Washington University.

ELERATED ASSOCIATE'S DEGREE COMPLETION PROGRAM

Accelerated Associate's Degree Completion Program is available at Fort in Virginia, and at the Washington Navy Yard in the District of Colum-

accelerated Program permits an individual to complete the degree of ciate in Arts in General Studies in approximately 18 months through part- study. Time to complete the Program will vary according to the amount anced standing granted through transfer of credit or by examination and ding to the number of courses the student is enrolled in. The Program is ed for the highly motivated individual who must complete his program dy in a limited period of time. Classes are open to everyone.

MASTER OF ART

THE DEGREE OF MASTER OF ARTS with a field in Religion and Medical Ca is a degree program offered by the Graduate School of Arts and Sciences und the direction of the Department of Religion. Although certain courses in th program are offered only through the College of General Studies' off-camp centers, candidates for this degree must register as campus degree candidate in the Graduate School of Arts and Sciences.

The program of study is interdisciplinary and combines both professiona and academic work. The intent of the program is (1) to provide training a an academic graduate milieu of chaplains and clergymen whose professiona effectiveness might be increased through the combination of clinical experienc and academic study; (2) to provide a program of study for those medical stu dents who have a sense of the significance of theological insights for the care of the whole man and who desire to combine their medical education with this correlative study; and (3) to provide a program of research and study in the area of religion and medical care for those whose theological training (e.g in ethics or sociology of religion) and interest are directed toward a vocation in teaching. Support for the program comes from (1) Clinical Training pro grams of the National Naval Medical Center, National Institutes of Health and Walter Reed General Hospital; and (2) the departments of Health Care Administration, Psychology, Religion, Sociology, and departments of the School of Medicine and Health Sciences.

The program of study leading to the degree of Master of Arts in the fie of Religion and Medical Care consists of 36 semester hours of approved cours work with or without a thesis and the passing of a Master's Comprehensive Examination.

For information concerning admission requirements and the specific require ments for the degree, contact the Graduate School of Arts and Sciences or the Chairman of the Department of Religion.

MASTER OF ARTS IN EDUCATION

The School of Education has academic jurisdiction over the degree of Mas of Arts in Education. This off-campus degree program is designed for educa tors who wish to increase their knowledge of professional and academic infor mation and to prepare for special types of educational service.

The Master of Arts in Education degree programs offered at off-campus centers are available in the following fields: elementary education; higher edu cation; human resource development; secondary education; special education; crisis-resource teaching, diagnostic-prescriptive teaching, early childhood spec education; supervision and human relations; and therapeutic recreation and adapta tive physical education.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and pages 20–21.

REQUIREMENTS FOR THE DEGREE

The program of study consists of a minimum of 33 or 36 semester hours of course work in core courses, depending upon the chosen field. The thesis (equivalent to 6 semester hours) is optional.

RESIDENCE

Advanced standing is granted for approved courses taken at other accredited institutions; however, a minimum of 30 semester hours must be completed at this University, with no less than 21 semester hours completed after admission to Master's degree candidacy.

SCHOLARSHIP

A quality-point index of 3.00 is required for graduation. Students who receive a grade of *C* in more than two courses are subject to suspension. Students who receive a grade of *F* must confer with the Dean of the School of Education before enrollment for further work.

INCOMPLETE/AUTHORIZED WITHDRAWAL

The conditions under which the grades of *I* (Incomplete) or *W* (Authorized Withdrawal) may be assigned are described on page 32.

Removing an Incomplete.—Although the grade of *I may* remain on the record for a maximum of one year, the instructor should normally set a much shorter period within which the uncompleted work (usually the final examination or a required paper) must be made up. The grade of *I* cannot be removed by registering for the course here, or by taking its equivalent elsewhere. An "Incomplete" cannot be made up after the lapse of one calendar year except by written permission of the Dean's Council. An "Incomplete" which is not removed within one calendar year is automatically changed to an *F*.

THE THESIS

Students who elect a thesis must register on campus for Educ 299–300. The choice of the thesis subject must be approved in writing by the student's adviser and filed in the Office of the Dean. A statement of the School of Education standards for the thesis and printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional calendar year may be granted without further tuition payment. The student must, however, maintain continuous registration (see page 36) during this period. If the preparation of the thesis extends beyond the additional calendar year, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

TAKING COURSES ON CAMPUS

A student registered in a degree program off campus who wishes to register for a course on campus, *must* file a formal graduate application which may be obtained from the Office of the Dean of the School of Education.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to the course examinations, the candidate must pass a special thre hour comprehensive examination on his area of specialization. Candidates f the examination must be registered for the semester it is to be taken, and mu file a written application in the Office of the School of Education no later th 30 days prior to the date of the examination.

EDUCATION SPECIALIST

The School of Education provides an off-campus program of advanced stud leading to the degree of Education Specialist in the field of Higher Educatio This program is for students with master's degrees in education who see further professional preparation.

ADMISSION

For detailed information see "Admission as a Degree Candidate," pages and 22–23.

REQUIREMENTS FOR THE DEGREE

A minimum of 30 semester hours beyond the requirements of the degree Master of Arts in Education at this University is required. At least 21 hours this work must be in courses offered by this University, on campus or in t approved off-campus degree center to which the candidate has been admitte with the approval of the adviser, the remaining semester hours of the progr may be taken at another approved university. A maximum of five calend years is allowed for the completion of the program. At least 12 of the requ 30 hours must be in appropriate graduate courses in Education selected fro the following areas: (1) foundations and cognate study, (2) background general principles of the field of study, (3) an area of specialization.

SCHOLARSHIP

Scholarship requirements for the degree of Education Specialist are the sa as those for the degree of Master of Arts in Education (see page 61).

THE COMPREHENSIVE EXAMINATION

Successful completion of a six-hour written examination and/or an oral exa nation, at the option of the major field adviser, is required.

MASTER OF ARTS IN SPECIAL STUDIES A MASTER OF SCIENCE IN SPECIAL STUD

The Graduate School of Arts and Sciences has academic jurisdiction over degrees of Master of Arts in Special Studies and Master of Science in Spec Studies. These degree programs provide a course of study appropriate to s students who wish to emphasize interdisciplinary work. They are offered

ff and on campus. The programs off campus can only be offered for a group
f students with mutual educational goals. The programs allow a maximum
f flexibility; however, they must be developed around identified objectives and
ust provide a structured sequence of study toward these goals. University
presentatives will work with interested groups to develop suitable programs.
he contemplated curriculum must be approved prior to admission to the
raduate School. A student interested in interdisciplinary work leading to one
f these degrees who is not in a group program must register on campus.
For information on Special Studies programs currently available in off-
ampus programs, see "Special Degree Programs," pages 78–80.
For detailed information on the regulations for the off-campus degrees, see
he *Handbook for Off-campus Students*, available at the Office of the Dean of
he Graduate School of Arts and Sciences.

MISSION

r detailed information, see "Admission as a Degree Candidate," page 17, and
es 21–22.

QUIREMENTS FOR THE DEGREES

he program of study consists of 36 semester hours of course work including
ajority of courses in the arts and sciences (e.g., economics, natural sciences,
litical science, psychology, sociology, statistics), with not more than one-
ed from any single department. *There are no thesis or tool requirements.*
anced undergraduate courses (those numbered 101–200) may be included
he program of study upon the approval of the Graduate School and with
provision that students complete additional work for graduate credit.
Each program of study must be approved by the Dean of the Graduate
hool of Arts and Sciences and the departmental advisers.

SIDENCE

inimum of 27 semester hours must be completed after admission to Mas-
degree candidacy.

HOLARSHIP

duate students are expected to maintain a minimum accumulative grade
ge of *B* (3.00) in all course work in the program of studies. Individual
ments may require a higher average.
the case of a student who receives a grade of *F* for a course in his pro-
of studies, the Graduate School will require a departmentally approved
en statement justifying the student's continuance in the Graduate School
outlining the program to be followed. Continuation is contingent upon
Dean's approval. A course in the program of studies for which an *F* is
ed cannot be subsequently removed from the program even though an-
course is taken as a substitute.

MPLETE/AUTHORIZED WITHDRAWAL

itions under which the grades of *I* (Incomplete) and *W* (Authorized With-
al) may be assigned are described on page 32.

Removing an Incomplete.—An "Incomplete" must be made up before the lapse of one calendar year. An "Incomplete" which is not removed within one calendar year remains as a grade of *I* on the student's record. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere.

MASTER'S COMPREHENSIVE EXAMINATION

Master's degree candidates must pass a Master's Comprehensive Examination administered by the Graduate School of Arts and Sciences on campus on specified dates.

A student who fails to pass the Master's Comprehensive Examination may, in exceptional circumstances, and with the approval of the department and the Dean, repeat the Examination at the next scheduled date. If he fails a second time, no further opportunity to take the Examination is permitted.

WITHDRAWAL

Graduate students who intend to withdraw from the Graduate School of Arts and Sciences should inform the School in writing. The last day for complete withdrawal without academic penalty is at the end of the eighth week of classes.

LEAVE OF ABSENCE

If a student is temporarily unable to continue his program of studies, he may request leave of absence for a specific period of time, not to exceed one calendar year. When the period of leave has expired, it is the student's responsibility to notify the Graduate School at least two months in advance of the given registration period of his intention to reregister. If he fails to reregister, his candidacy will be terminated.

MASTER OF SCIENCE IN ADMINISTRATION

The School of Government and Business Administration has academic jurisdiction over the degree of Master of Science in Administration. This degree program provides a course of study appropriate for those students currently working in government or industry. It is a professional degree, preparing graduates for positions of higher and broader responsibility and generally improving their competence as administrators. Students expecting to continue in a doctoral program should consult the Committee on Doctoral Studies in the School of Government and Business Administration concerning necessary prerequisites. Students will usually find it advantageous to consult with the Committee early in planning their Master's degree programs.

The University cannot guarantee that all courses in this curriculum will be offered at every off-campus center. However, any student who has been admitted to degree candidacy may arrange to complete his curriculum by registering on campus. *Campus registration is limited to 12 semester hours of the last 18 hours of the degree program.* Only students with Bachelor's degrees may register for courses numbered above the 200 level in the School of Government and Business Administration.

OBJECTIVES OF THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

The principal objective of the School of Government and Business Administration is to prepare its graduates for positions in the management of complex organizations in both business and government. The degree programs are designed to prepare students both for *entrance* into business and government and for *advancement* to high-level management positions.

Programs in the School include examination of administrative principles and quantitative approaches to decision-making common to both business and government. These programs stress the points at which major policy decisions of either business or government must give consideration to related policy decisions of the other. Emphasis is placed on the fact that management education is not limited to organizational techniques but is, in the broadest sense, education for management responsibility.

It is the policy of the School to emphasize a broad fundamental education as the best preparation for positions carrying management or administrative responsibility.

The degree of Master of Science in Administration develops the elements common to all management positions regardless of the nature of the operation. The degree program is based on the study of the principles of management, human relations, and problem-solving plus an area of specialization.

In order to provide students with a common body of knowledge of business or governmental administration, programs include the equivalent of at least one year of work comprising the following areas:

In the case of business enterprise, a background of the concepts, processes, and institutions in marketing and distribution, production, and financing operations; in the case of governmental administration, a background of concepts, processes, and institutions of planning, programming, budgeting, personnel practices, and policy formulation in government.

A background of the economic and legal environment of business and government enterprise, along with consideration of the social and political influences on business.

A basic understanding of the concepts and methods of accounting or controlling, quantitative methods, and information systems.

A study of organization theory, interpersonal relationships, control and communication systems, and communications.

A study of administrative processes under conditions of uncertainty, including the integration of analysis and policy determination at the over-all management level.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and "Graduate Study," page 15.

REQUIREMENTS FOR THE DEGREE

RESIDENCE

A minimum of 30 semester hours of graduate work must be completed while registered as a degree candidate in this off-campus program.

Thesis and thesis seminar (6 semester hours) may be included in the 30

hours of course work taken in residence. A graduate student who transfe
from another division of the University is required to have a minimum of
hours of course work as a degree candidate in this off-campus program.

SCHOLARSHIP

An average of *B* or better is required for the Master's degree. The grade of C
is not considered as failing but must be counter-balanced by a grade of *A* in
graduate course of equal status. A Master's degree candidate who receives
grade of *F* in a course required in his program of study is required to prese
cause for consideration by the Dean's Council of the School of Governme
and Business Administration as to why he should be allowed to continue
studies toward a degree objective. A student whose scholarship is unsatisfa
tory may be suspended.

INCOMPLETE/AUTHORIZED WITHDRAWAL

Conditions under which the grades of *I* (Incomplete) and *W* (Authorized Wit
drawal) may be assigned are described on page 32.

Removing an Incomplete.—The grade of *I* must be removed no later th
the last day of the examination period for the fall or spring semester immedi
ately following the semester or summer session in which the grade of *I* w
signed. An "Incomplete" that is not removed within this period is automat
changed to an *F*. In cases of well-documented extenuating circumstances,
instructor and a student may jointly petition the Dean, or the appropriate
mittee, for additional time in which to complete the work of the course. S
petitions should be submitted within the same period. The grade of *I* c
be removed by reregistering for the course here, or by taking its equivalent
elsewhere.

THESIS

With the approval of the adviser, a thesis may be substituted for 6 semester
hours of course work.

The thesis subject and the thesis in its final form must be approved by
director of the thesis and the faculty adviser and presented to the Dean of
School of Government and Business Administration no later than the date
nounced in the calendar. Printed copies of detailed regulations regarding
form and reproduction of the thesis are available at the Office of Counseling
and Information Services, College of General Studies.

Payment of tuition for the thesis entitles the candidate, during the
semesters he registers for thesis (299–300), to the advice and direction of
member of the faculty under whom the thesis is to be written. In case
is unfinished, an additional successive academic year is granted without
tuition payment. The student must, however, maintain continuous registration
during this period. If the preparation of the thesis extends more than
semesters beyond the date the student registers for thesis 300, he must re
for the entire 6 hours of thesis again and pay tuition as for a repeated course.

COURSE SUBSTITUTION

It is the responsibility of the student to get written approval from the faculty
adviser prior to registration for any course substitution. Forms for requesting
substitution are available at the Office of Counseling and Information Services,
College of General Studies.

MASTER'S COMPREHENSIVE EXAMINATION

The Master's candidate is required to pass a written Master's Comprehensive examination. Before applying for the examination, the student must have completed or be registered for all of the courses in his program, and he must have maintained a 3.00 *(B)* average. If a student has completed all course work, continuous registration must be maintained, and the continuous registration fee paid, until the examination is taken, except for the Summer Sessions if the student does not intend to take the examination at that time. *After applying for the examination, a candidate may withdraw only by notice in writing to the appropriate department chairman. Failure to take the examination without an official withdrawal constitutes a failure for the examination.* In writing the examination, the student is expected to correlate what he has learned in his course work and his reading in the literature of the field. The examinations are conducted at the University in December for students graduating in February, in April for students graduating in May, and in July and August for students graduating in September.

A candidate who fails the examination may, in exceptional circumstances and with specific approval of his advisers, repeat the examination, but only after the lapse of one semester and the undertaking of additional preparation as prescribed. *If he fails a second time, no further opportunity to take the examination will be permitted.*

REQUIRED COURSES

The following courses are listed in the approximate order they should be elected in the student's program of study:

		Semester Hours
Mgt 201:	Advanced Administrative Management	3
*Mgt 204:	Quantitative Factors in Administration	3
Mgt 207:	Human Behavior in Organizations	3
†Mgt 240:	Survey of Information Technology	3
†BAd 202:	Relations of Government to Business	3
‡Econ 220:	Survey of Principles and Issues in Economics	3
		12–18
Area of concentration:		
‖Elective:		12–24
	(To be selected with the approval of the adviser)	0–6
	Total	36

ADMINISTRATION OF SCIENCE AND TECHNOLOGY

Advisers: Daniel D. Roman, Professor of Management Science, Government Telephone 676-6678; Jack W. Waldrip, Assistant Professor of Business Administration, Building Y, Room 21, 2131 G Street, N.W., Telephone 676-7139.

* is waived for students electing Administration of Science and Technology, Business Finance, Management, Industrial Management, Information Systems Technology, or Operations Research and Systems Analysis as an area of concentration. Students in these areas utilize Mgt 225 to satisfy the quantitative requirement.

† required in the Public Administration area of concentration.

‡ required in the Administration of Science and Technology area of concentration.

‖ Econ 217–18 may be used to satisfy the Econ 220 requirement and 3 semester hours of elective. For the Public Administration area of concentration, Econ 217–18 must be submitted for Econ 220.

§ is waived in this area of concentration.

The field of concentration in Administration of Science and Technology ex-
plores the many aspects of technology relating to and influencing research and
development management, business, and public policy. The employment of
"state-of-the-art" technology and the creation of new technology through re-
search and development are important processes in the achievement of the
objectives of both private firms and governments.

The research and development environment has many unique operational
characteristics. The program of graduate study in this concentration has been
designed to identify and study the problems associated with managing creative
professional people in a dynamic technology. As a contextual area, the program
stresses the need for students to undertake original and meaningful research
involving political, economic, sociological, and operational problems encoun-
tered by management in industrial, governmental, and military research and
development organizations.

		Semester Hours
Econ 217–18:	Survey of Economics	6
*Mgt 225:	Managerial Statistics I	3
Mgt 260:	Introduction to General Systems and Cybernetics	3
BAd 220:	Administration of Research and Development	3
BAd 229:	Seminar: Administration of Research and Development	3
PAd 235:	Technological Change and Manpower	3
PAd 262:	Seminar: Science, Technology, and Public Policy	3
		24

II. BEHAVIORAL SCIENCES IN ORGANIZATION DEVELOPMENT

Faculty Advisers: Erik K. Winslow, Associate Professor of Behavioral Sciences, Gov-
ernment 201, Telephone 676-7375; Jerry Harvey, Associate Professor of Manage-
ment Science, Building Y, Room 10, 2131 G Street, N.W., Telephone 676-6205.

This area of concentration reflects the assumption that the effective utilization
of the behavioral sciences is concerned with both means and ends; that the
specialist in behavioral science not only is skilled in theory and research but
also applies his technical and specialized knowledge as a conscious force in ef-
fective organizational growth and improvement. Thus, courses are designed to
equip the student with organizational concepts and behavioral skills appropriate
to optimizing the utilization of a system's total resources.

This program is designed to fulfill the need for professionals capable of de-
signing, creating, and developing the necessary behavioral and organizational
systems appropriate to rapidly changing societies. Emphasis is on the interre-
tionships of such dimensions as motivation, leadership, problem-solving, organ
zational growth, and increased complexity of modern organizations and their
effect upon the function of organizational development.

†Mgt 208:	Current Issues in Organizational Behavior
†Mgt 210:	Behavioral Factors in the Process of Change
†Mgt 212:	Organizational Development: Concepts and Methods
Mgt 260:	Introduction to General Systems and Cybernetics
†Mgt 261:	Fundamentals of General Management Systems and Organizational Cybernetics

* Mgt 203 *Mathematics for Management* or the equivalent is prerequisite for this course.
† Offered only on campus.

		Semester Hours
Other Courses:	To be selected from the following as approved by the adviser	3
BAd 211:	Leadership and Executive Development	
BAd 220:	Administration of Research and Development	
Mgt 213:	Consultative Processes in Organizations	
PAd 223:	Behavioral Factors in Large Organizations	
PAd 233:	Seminar: Manpower Development and Utilization	
		18

BUSINESS FINANCIAL MANAGEMENT*

...ulty Adviser: Rodney W. Eldridge, Associate Professor of International Finance. ...vernment 405, Telephone 676-6892.

...s area of concentration provides a background in business budgeting, con...llership, treasury, long-range planning, reporting, and financial management ...cesses. Courses are designed to emphasize the planning, analysis, implemen...on, and controls necessary for making effective financial decisions.

Acct 215:	Survey of Managerial Accounting	3
BAd 231:	Financial Decision-making	3
BAd 232:	Capital Resource Management	3
BAd 233:	International Business Finance	3
BAd 237:	Investment Analysis	3
†Mgt 225:	Managerial Statistics I	3
		18

INDUSTRIAL MANAGEMENT

...ty Advisers: Robert C. Sedwick, Professor of Business Administration, Tidewater ...r, Telephone (804) 838-8444; Guy Black, Professor of Business Administration, ...rnment 302, Telephone 676–6115.

...area of concentration prepares students for careers in industrial manage... Work covers the organization and functioning of industrial firms as well ...e management practice and problems associated with them.

Acct 215:	Survey of Managerial Accounting	3
BAd 208:	Personnel Management and Industrial Relations	3
BAd 225:	Seminar: Manufacturing Production	3
BAd 261:	Applied Microeconomics	3
BAd 279:	Purchasing and Materials Management	3
BAd 297:	Business Policy Formulation	3
†Mgt 225:	Managerial Statistics	3
		21

RSONNEL MANAGEMENT

...Adviser: Roy B. Eastin, Professor of Business Administration, Government ...ephone 676-6063.

...is waived in this area of concentration.
... *Mathematics for Management* or the equivalent is prerequisite for this course.

This area of concentration provides a basic academic and professional founda-
tion, equipping the student for administrative responsibility in personnel man-
agement. The courses cover the fields of personnel management, industrial
relations, unionism, collective bargaining, labor relations, and manpower de-
velopment and utilization.

		Semester Hours
BAd 208:	Personnel Management and Industrial Relations	3
BAd 209:	Seminar: Personnel Management	3
BAd 212:	Unionism and Collective Bargaining	3
BAd 213:	Current Issues in Unionism, Collective Bargaining, and Labor Relations	3
PAd 233:	Seminar: Manpower Development and Utilization	3
		15

VI. INFORMATION SYSTEMS TECHNOLOGY*

Faculty Advisers: John F. McCarthy, Jr., Associate Professor of Business Administration, Government 409, Telephone 676-7089; Walton E. Smith, Associate Professor of Management Science, Building Y, Room 22, 2131 G Street, N.W., Telephone 676-7159.

This area of concentration is designed to provide a managerial understanding of the principles of manual, mechanical, and electronic information processing, including computer programming concepts, methods, and languages; an appreciation of the capabilities, limitations, and selection procedure of information processing equipment; a knowledge of all phases of management information systems development, implementation, and evaluation; and an understanding of the roles of both management and systems personnel in information technology. It also provides an appreciation of the role of information technology as a tool of management.

Students actually participate in the development of management information systems; in the selection of computer equipment; and in the installation, management, and evaluation of management information systems during class sessions.

†Mgt 225:	Managerial Statistics I	3
Mgt 241:	Management Information Systems Development and Application	3
Mgt 242:	Comparative Computer Systems	3
Mgt 243:	Management of Information Technology	3
Mgt 260:	Introduction to General Systems and Cybernetics	3
		15

VII. INTERNATIONAL COMMERCE

Faculty Adviser: G. Peter Lauter, Professor of Business Administration, Government 404, Telephone 676-7374.

* Mgt 204 *Quantitative Factors in Administration* is waived in this area of concentration. Mgt 246 *Information Systems and Telecommunication* (3) and Mgt 245 *Data Base Management* (3) are recommended electives for this area.

† Mgt 203 *Mathematics for Management* or the equivalent is prerequisite to this course.

This area of concentration prepares students for careers in firms operating on a multinational basis or about to enter the international field; for careers in the federal government and in international agencies concerned with business, industry, and finance abroad; and for the commerce option of the Foreign Service Officer Examination.

		Semester Hours
BAd 233:	International Business Finance	3
BAd 248:	International Marketing	3
BAd 255:	Multinational Corporations in the World Economy	3
BAd 256:	Seminar: International Trade	3
BAd 257:	Business Policy in the Multinational Firm	3
		15

MANAGERIAL ACCOUNTING

Faculty Adviser: Anthony J. Mastro, Professor of Accounting, Government 302, Telephone 676-6055.

This area of concentration provides a knowledge of interrelated systems of accounting in planning and control for management. Emphasis is on the requirements of management for accounting information with concern for general and corporate accounting principles to the extent related to the managerial accounting functions.

Acct 115 *Survey of Financial Accounting* or the equivalent is prerequisite to the Managerial Accounting area of concentration.

*Acct 215:	Survey of Managerial Accounting	3
Acct 262:	Business Income Taxation	3
Acct 276:	Management Planning and Control	3
Acct 296:	Seminar in Accounting	3
BAd 231:	Financial Decision-making	3
		15

OPERATIONS RESEARCH AND SYSTEMS ANALYSIS†

Faculty Adviser: William W. Hardgrave, Associate Professor of Management Science, Building Y, Room 20, 2131 G Street, N.W., Telephone 676-6852.

This area of concentration develops an understanding of quantitative approaches to problems of managerial control and decision-making. While the curriculum will develop a competent background in basic mathematical theory associated with the various techniques, it is oriented towards applications of the techniques rather than their theoretical mathematical content.

*Mgt 225:	Managerial Statistics I	3
Mgt 226:	Managerial Statistics II	3
Mgt 227:	Mathematical Programming: Techniques and Applications	3
Mgt 228:	Techniques of Operations Research	3
Mgt 229:	Seminar: Management Science and Operations Research	3

*Acct 215 or an equivalent course has been taken prior to entrance into this program, students may substitute Acct 275 or 282.

†Math 204 is waived in this area of concentration.

‡Math 209 *Mathematics for Management* or the equivalent is prerequisite for this course.

		Semester Hours
Other Courses:	To be selected from the following as approved by the adviser	6
BAd 225:	Seminar: Manufacturing Production	
Mgt 242:	Comparative Computer Systems	
Mgt 260:	Introduction to General Systems and Cybernetics	21

X. PROCUREMENT AND CONTRACTING

Faculty Adviser: Stanley N. Sherman, Associate Professor of Business Administration, Government 312, Telephone 676-7462.

This area of concentration provides a basic academic and professional foundation, equipping the student for administrative responsibility in procurement and contracting. The courses cover industrial purchasing, procurement activities of the federal government, and contracting activities of vendors to the federal government.

BAd 279:	Purchasing and Materials Management	3
BAd 280:	Procurement and Contracting	3
BAd 282:	Government Contract Administration	3
BAd 283:	Pricing and Negotiation	3
BAd 285:	Systems Procurement and Project Management	3
		15

XI. PUBLIC ADMINISTRATION

Faculty Advisers: David S. Brown, Professor of Management, Government 302, Telephone 676-6295; Stephen R. Chitwood, Associate Professor of Public Administration, Building D, Room 405, Telephone 676-6064; Irwin Dubinsky, Assistant Professor of Public Administration, Building D, Room 402, Telephone 676-6516.

This area of concentration provides a background in the basic fundamentals of public administration for all levels of governmental activity. The courses are designed to reflect the current theory as well as the practical and analytical concepts associated with governmental units of all kinds.

PAd 210:	Concepts and Issues in Public Administration	3
PAd 213:	Administration in the Federal Government	3
PAd 223:	Behavioral Factors in Large Organizations	3
PAd 245:	Intergovernmental Relations	3
PAd 251:	Governmental Budgeting	3
PAd 260:	Policy Formulation and Administration	3
Other Courses:	To be selected from the following as approved by the adviser	6
Acct 215:	Survey of Managerial Accounting	
Acct 245:	Decision Systems and Accounting	
BAd 202:	Relations of Government to Business	
BAd 220:	Administration of Research and Development	
Mgt 240:	Survey of Information Technology	
PAd 231:	Public Personnel Administration	

	Semester Hours
PAd 233: Seminar: Manpower Development and Utilization	
PAd 235: Technological Change and Manpower	
PAd 262: Seminar: Science, Technology, and Public Policy	
PAd 295: Research Methods	
	21

ECTIVES

less a student elects to write a thesis, he may select electives appropriate to program from graduate courses offered by the School of Government and ness Administration. To choose electives from the courses offered by the ool of Government and Business Administration or to choose them from er related departmental offerings in this University, the student must obtain written approval of the faculty adviser prior to registration. A form for purpose may be obtained from the Office of Counseling and Information ices, College of General Studies.

STER OF SCIENCE

School of Engineering and Applied Science in cooperation with the Na- al Aeronautics and Space Administration's Langley Research Center, Hamp- Virginia, has a graduate engineering program at NASA-Langley. NASA- ley's extensive scientific and engineering facilities and equipment are avail- to students in this program.

e programs at NASA-Langley lead to the degree of Master of Science in fields of acoustics, aerospace engineering, environmental modeling, struc- and dynamics, flight sciences, fluid mechanics and thermal sciences, solid anics and materials science, electrical engineering, and computer science. programs are open to qualified NASA employees and area residents. the approval of the instructor, courses may be taken in nondegree status.

e School of Engineering and Applied Science in cooperation with the l Ship Research and Development Center, Annapolis, Maryland, has a ate engineering program leading to the degree of Master of Science in of materials science and systems science. The programs are open to ied NSRDC employees and area residents.

e School of Engineering and Applied Science in cooperation with the l Ship Research and Development Center, Carderock, Maryland, has a ate engineering program leading to the degree of Master of Science in the of ocean and marine engineering. The program is open to qualified C employees and area residents.

School of Engineering and Applied Science has academic jurisdiction hese degree programs which are administered by the College of General

SION

ailed information see "Admission as a Degree Candidate," page 17, and
2.

REQUIREMENTS FOR THE DEGREE

The minimum program consists of 24 semester hours of approved gradua courses and a Master's thesis (equivalent to 6 semester hours). The stude may elect an optional program without a thesis which consists of a minimu of 33 semester hours of approved graduate courses. All Master's candidate are required to pass a Master's Comprehensive Examination. Students who undergraduate study does not include necessary prerequisites may be require to take more than the minimum semester hours required.

Upon admission the student is assigned an adviser. Programs of study a determined by any prerequisites established and the requirements of the depar ment in which the student wishes to study. The program of studies in prepar tion for the Master's Comprehensive Examination must be approved by th student's adviser and the appropriate department chairman.

SCHOLARSHIP

For Master's work, a minimum of 24 semester hours (for those who receiv credit for a thesis) or 33 semester hours (for those who follow the optional pro gram without a thesis) of graduate course work with the grade of *B* or higher required for graduation. Students who receive two grades of *F*, or three grade below *B*, are barred from further enrollment in graduate courses and, ordinarily will not be readmitted to graduate study. Students who receive the grade of in one or two courses are required to take additional course work to make up the minimum semester hours of work with grades of *B*.

INCOMPLETE AUTHORIZED WITHDRAWAL

Conditions under which the grades of *I* (Incomplete) and *W* (Authorized Withdrawal) may be assigned are described on page 32.

Removing an Incomplete.—Although the grade of *I may* remain on the re ords for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work must be made up. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere. An "Incomplete" which is not removed within one calendar year is automatically changed to an *F*.

RESIDENCE

In general, a minimum of one year of full-time study, or the equivalent in part-time study, must be completed in the School of Engineering and Applied Science.

MASTER'S THESIS

In those programs requiring a thesis, the degree candidate must submit an ac ceptable thesis to demonstrate his ability to make independent use of the knowledge and discipline of thought acquired and developed by graduate study, to furnish objective evidence of constructive power in a given field, and to demonstrate that he can communicate the results of his work in writing. Work of a suitable character for which the student has professional responsibility may be considered, whether done on or off campus, provided no significant amount of work is completed without faculty supervision.

As a part of registration for the thesis course 299, the candidate must submit to the appropriate department chairman (on the form obtainable at the School office) his thesis area, approved by his faculty adviser. He must submit his thesis title to the Dean, on the form available in the School office, at the beginning of the semester in which he expects to graduate. Registration in thesis 299–300 entitles the student, during such registration, to the advice of the member of the faculty under whom the thesis is to be written. He may consult his adviser, but the thesis is the exclusive responsibility of the student.

The thesis in final form must be submitted to the appropriate department chairman by the date stated in the calendar for the semester in which the candidate enrolls in thesis 300. In case a thesis is unfinished on the date specified, the student will be granted an additional semester and must pay the "Continuous Registration" fee (see page 36) unless he is registered for course work. If the preparation of the thesis extends beyond the three semesters, approval for an extension of time will be required and the student must reregister for thesis 300 and pay tuition as for a repeated course.

A thesis may be submitted in final form one time. The acceptability of the thesis is determined exclusively by the Master's Comprehensive Examination Committee. If the thesis is unacceptable, the student's graduate status is terminated.

Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the School. Accepted theses, with accompanying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for circulation.

OPTIONAL MASTER'S PROGRAM WITHOUT A THESIS

The student may elect an optional program without a thesis which consists of a minimum of 33 semester hours of approved graduate courses.

MASTER'S COMPREHENSIVE EXAMINATION

After completing his prescribed program, the candidate must pass a Master's Comprehensive Examination, to demonstrate substantial understanding of principles and method and their use in the area of his interest. This Examination may be written, oral, or both. A graduate student who fails any portion of the Master's Comprehensive Examination on his first attempt may be examined one more time if approval is given by the appropriate Examining Committee. In the event of failure to complete the Examination satisfactorily, the student's graduate status terminates.

TIME TO COMPLETE MASTER'S DEGREE REQUIREMENTS

A full-time Master's candidate is allowed a maximum of three calendar years to complete all degree requirements, from the date of his first graduate-student registration in prerequisite or graduate courses. A part-time Master's candidate is allowed a maximum of five calendar years. The time limit does not include any period of registration as an unclassified student before admission to graduate student status, nor does it encompass any specified period spent on approved leave of absence. Readmission is required upon expiration of leave of absence under the conditions and requirements then prevailing.

Students who do not complete degree requirements within the allowed time have their graduate status terminated. They may be readmitted to graduate status under conditions specified by the department chairman and approved by the Dean.

MASTER OF ENGINEERING ADMINISTRATION

The School of Engineering and Applied Science in cooperation with the Naval Section, Prince Georges Center Building, Maryland, and the Naval Ordnance Station, Indianhead, Maryland, is in the developmental stage of offering a graduate program leading to the degree of Master of Engineering Administration. The program will be open to employees of these organizations and area residents.

The School of Engineering and Applied Science has academic jurisdiction over this degree program which is administered by the College of General Studies.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and page 22.

REQUIREMENTS FOR THE DEGREE

The requirements for the degree of Master of Engineering Administration are the same as those listed under the degree of Master of Science (see pages 73–76).

DOCTOR OF SCIENCE*

The Doctor of Science degree program offered by the School of Engineering and Applied Science is designed to prepare the student for a career of creative scholarship by providing a broad, balanced background of knowledge and guidance in the performance of research. It requires study of interrelated fields of learning as well as original research in the field of central interest. The doctoral program for each student is determined, on an individual basis, by the student and his adviser. Work for the doctoral degree must be done in residence on campus except when special permission is granted by the chairman of the department.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and page 23.

* Complete information on the Doctor of Science degree program is contained in the *School of Engineering and Applied Science Catalogue.*

IREMENTS FOR THE DEGREE

rogram of study for the degree of Doctor of Science is divided into two . The first—made up of a study of interrelated fields of learning which rts the general area of research concentration—culminates in the qualify- xamination. The second—composed of research investigation of a partic- ubject in a special field and the presentation of such research findings in tten dissertation—culminates in the final examination. The general re- ments for the Doctor of Science degree are (1) a minimum of 30 semes- ours of course work beyond the Master's degree in preparation for the ying examination; (2) a reading knowledge of one foreign language, pref- Russian; (3) the satisfactory completion of the qualifying examination; dissertation, equivalent to a minimum of 24 semester hours; and (5) the actory passing of the final oral examination.

e candidate must submit to the appropriate department five complete copies e dissertation and two original copies of an abstract (not to exceed 600) of his dissertation no later than the date specified in the calendar. One of the abstract is for inclusion in the announcement of the examination ne for reproduction by University Microfilms, Inc. One copy of the dis- ion is also sent to University Microfilms, Inc.

nted copies of detailed regulations regarding the form and reproduction e dissertation, preparation of the abstract, and services offered by Univer- Microfilms, Inc., are available at the School Office. The successful candi- for the doctorate is required, before receiving his degree, to pay a fee to a part of the expense of printing the abstract of his dissertation, and for asic service rendered by University Microfilms, Inc. Accepted dissertа- with accompanying drawings, become the property of the University re deposited in the University Library where bound copies are available irculation.

UAGE REQUIREMENT

ctoral student should maintain a broad outlook as he pursues his study, herefore must have the capability of reading appropriate literature pub- in a foreign language. Accordingly, a reading knowledge of one foreign age, preferably Russian, must be demonstrated before admission to the ying examination. If the student wishes to satisfy this requirement with a age other than Russian, he must obtain the approval first of his doctoral er, then of his department chairman; permission to use a language other Russian will be granted on the basis of its importance to the student's of interest.

REQUIREMENT

dition to the language requirement, an examination in a tool requirement computer programming) may be established by the various departments.

OLARSHIP

e admitted to the qualifying examination, the doctoral student must achieve ver-all academic average of 3.20 on a scale of 4 (a grade of *A* equals 4

points; *B*, 3 points; *C*, 2 points; and *F*, 0 points). No doctoral student may re-
ceive more than two course grades below *B*. If he does receive more than two
course grades below *B*, his graduate study is terminated and his further enroll-
ment prohibited. Courses in which the student earns grades below *B* are not
included in his total semester-hour requirement for the degree. In the event a
student receives any grade below *B*, he is required to consult with his advisor
for a review of his program of study and discussion of possible changes thereto.

SPECIAL DEGREE PROGRAMS

MASTER OF ARTS IN SPECIAL STUDIES (Criminal Justice)

A new program of study leading to the degree of Master of Arts in Special
Studies with a concentration in Criminal Justice is offered off campus by the
Graduate School of Arts and Sciences. This interdisciplinary degree program
consists of study in criminology, forensic sciences, law, management science,
psychology, and sociology, and is particularly appropriate for law enforcement
personnel or for students considering a career in law enforcement. For further
information, contact one of the following: Richard C. Allen, Chairman of the
Department of Forensic Sciences, telephone 676–7390; the Office of the Dean
of the Graduate School of Arts and Sciences, telephone 676–6210; or College
of General Studies Staff Members—Ralph I. DeBelles, Director of District of
Columbia Credit Programs, telephone 676–7061; Douglas Carter, Director of
Maryland Credit Programs, telephone 676–7022; John A. Morrow, Director of
Virginia Credit Programs, telephone 676–7040.

MASTER OF ARTS IN SPECIAL STUDIES (Higher Education Affairs)

A new program of study leading to the degree of Master of Arts in Special
Studies with a concentration in Higher Education Affairs is offered off campus
by the Graduate School of Arts and Sciences. This degree program focuses on
the role of the national organizations representing the field of higher education.
The curriculum is designed to provide the participants with an increased aware-
ness of trends in the field of higher education and the tools needed to increase
the effectiveness of the various associations of which they are a part. For fur-
ther information, contact the Office of the Dean of the Graduate School of Arts
and Sciences, telephone 676–6210, or Ralph I. DeBelles, Director of District of
Columbia Credit Programs, College of General Studies, telephone 676–7

MASTER OF ARTS IN SPECIAL STUDIES (Legislative Affairs)

A program of study leading to the degree of Master of Arts in Special Studies
with a concentration in Legislative Affairs is offered off campus by the Graduate
School of Arts and Sciences. The program, focusing on the Congress of the
United States, includes course work in legislative theory and research, the pro-
cesses of politics, and public policy analysis. For further information, contact
the Office of the Dean of the Graduate School of Arts and Sciences, telephone
676-6210, or Harvey D. Snyder, Associate Director of District of Columbia
Credit Programs, College of General Studies, telephone 676–7028.

STER OF ARTS IN SPECIAL STUDIES (Urban Learning)

program of study leading to the degree of Master of Arts in Special Studies a concentration in Urban Learning is offered off-campus by the Graduate ool of Arts and Sciences. The curriculum is designed to improve the urban cator's and city teacher's understanding of the environment in which he or operates, with emphasis on social problems. For further information, con- the Office of the Dean of the Graduate School of Arts and Sciences, tele- ne 676-6210, or William C. Shelton, Sr., Associate Director of District of umbia Credit Programs, College of General Studies, telephone 676–7067.

TER OF SCIENCE IN ADMINISTRATION

ooperation with the Industrial College of the Armed Forces, Fort McNair, hington, D.C., a program of study leading to the degree of Master of Sci- in Administration is offered by the School of Government and Business inistration. The program is open only to current students and faculty of Industrial College of the Armed Forces. For further information, contact y R. Page, Faculty Adviser for the Industrial College of the Armed Forces gram, School of Government and Business Administration, telephone 7219, or LeRoy S. Paul, Associate Director of District of Columbia Credit grams, College of General Studies, telephone 676-7062.

TER OF SCIENCE IN SPECIAL STUDIES (Environmental Studies)

rogram of study leading to the degree of Master of Science in Special es with a concentration in Environmental Studies is offered off-campus by Graduate School of Arts and Sciences. The program is designed to give pational safety and health officials an enhanced understanding of the ad- tration of regulations in an industrial work environment. The curriculum des industrial hygiene and health, environmental impacts, economics and rce management, technology and public policy, and biostatistics. For er information contact the Office of the Dean of the Graduate School of and Sciences, telephone 676-6210.

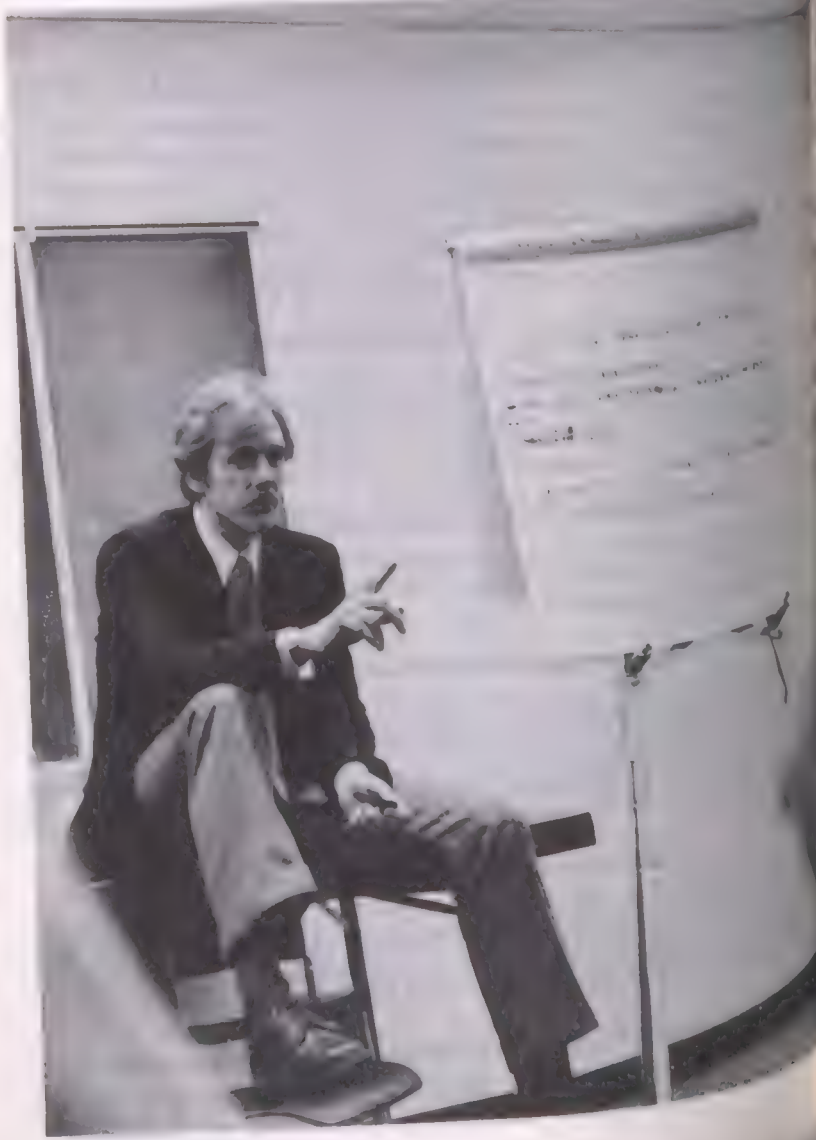
TER OF SCIENCE IN SPECIAL STUDIES (Social and Economic Statistics)

gram of study leading to the degree of Master of Science in Special es with a concentration in Social and Economic Statistics is offered off- s by the Graduate School of Arts and Sciences. The program is offered o students at the International Statistical Program Center of the U.S. of the Census. It is designed to give a knowledge of the theories, con- principles, and literature of social and economic statistics, and back- and management leadership in staff development as it relates to plan- and implementation of statistical analyses. The curriculum includes graphic and statistical methods, management and organization, and eco- and social development. For further information contact the Office of ean of the Graduate School of Arts and Sciences, telephone 676-6210.

ER OF SCIENCE IN SPECIAL STUDIES (Telecommunication Operations)

rogram of study leading to the degree of Master of Science in Special s with a concentration in Telecommunication Operations is offered off

campus by the Graduate School of Arts and Sciences. This program is de
signed to introduce personnel with technical backgrounds in communication
to related work in the field of business administration, economics, manage
ment science, political science, sociology, and statistics. For further infor
mation, contact the Office of the Dean of the Graduate School of Arts an
Sciences, telephone 676–6210, or one of the following College of General Stud
ies Staff Members—LeRoy S. Paul, Associate Director of District of Columbia
Credit Programs, telephone 676–7062; Herbert K. Berthold, Associate Director
of Virginia Credit Programs, telephone 676–7014.



FF-CAMPUS LOCATIONS OF HE COLLEGE OF GENERAL STUDIES

TRICT OF COLUMBIA

g Air Force Base, Washington, D.C. 20332

tation Director: Edward Corbin
Office: Building 500
Telephone: 767-5348
esentative for the University: L.S. Paul
Telephone: 676-7062
n to military and civilian personnel

eral After-hours Program

esentative for the University: Robert W. Stewart, Jr.
Telephone: 676-7018
n to everyone

following agencies participate in the Federal After-hours Program:

BUREAU OF CUSTOMS, WASHINGTON, D.C. 20226

Director: James J. Doherty, Training and Career Development
Office: 2100 K Street, N.W.
Telephone: 964-8000

BUREAU OF DOMESTIC AND INTERNATIONAL BUSINESS, WASHINGTON, D.C. 20230

Education Director: Bruce Robinson, Chief, Employee Development Branch
Office: Room 3525, Commerce Department Building, 14th Street and Constitution Avenue, N.W.
Telephone: 967-7075 or 967-7076

BUREAU OF NARCOTICS AND DANGEROUS DRUGS, WASHINGTON, D.C. 20573

Education Director: N.E. Bentson, Personnel Officer
Office: Room 605, 1405 Eye Street, N.W.
Telephone: 382-4231

CIVIL SERVICE COMMISSION, WASHINGTON, D.C. 20415

Anthony W. Hudson, Director of Personnel and Labor Relations
For information contact Employee Development Officer, Personnel Division
Office: Room 1679, 1900 E Street, N.W.
Telephone: 632-5400

COAST GUARD, WASHINGTON, D.C. 20591

W.I. Barry, Chief, Training Section, Headquarters Civilian Personnel Branch (CAS-5/81)
Office: Room 8114A, Nassif Building, 400 7th Street, S.W.
Telephone: 426-2342

DEPARTMENT OF JUSTICE, WASHINGTON, D.C. 20530

Education Director: Jack Rottman, Chief, Career Development Section
Office: Room 1623, 10th Street and Pennsylvania Avenue, N.W.
Telephone: 739-5255

DEPARTMENT OF LABOR, WASHINGTON, D.C. 20210

Office: Room 6141, 14th Street and Constitution Avenue, N.W.
Telephone: 961-2101

DEPARTMENT OF THE TREASURY, WASHINGTON, D.C. 20226

BUREAU OF ACCOUNTS

Education Director: Pamela Carlson, Employee Development Specialist
Office: Room 112, Treasury Annex Number 1, Pennsylvania Avenue and Madison Place, N.W.
Telephone: 964-5565

DISTRICT OF COLUMBIA GOVERNMENT, WASHINGTON, D.C. 20001

Education Director: C. Howard Larson, Chief, Training and Career Development
Office: Room 215, 499 Pennsylvania Avenue, N.W.
Telephone: 629-2997

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C. 20591

Education Director: Phyllis Burbank, Employee Development Specialist
Office: Room 510, 800 Independence Avenue, S.W.
Telephone: 426-3320

FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D.C. 20554

Education Director: Thomas Tate
Office: Room 208, 1919 M Street, N.W.
Telephone: 632-6304 or 632-6385

FEDERAL RESERVE SYSTEM, WASHINGTON, D.C. 20551

Education Coordinator: Sudelle Rice, Personnel Technician
Office: 20th Street and Constitution Avenue, N.W.
Telephone: 737-1100, Extension 404

ENERAL SERVICES ADMINISTRATION, WASHINGTON, D.C. 20405

raining Officer: Joel B. Gerstle
Office: Room 1142, 18th and F Streets, N.W.
Telephone: 343-4641 or 343-7681

NTERNAL REVENUE SERVICE, WASHINGTON, D.C. 20224

ducation Director: D.C. Barry, Chief, National Office Training Branch
Office: Room 1311, 12th Street and Constitution Avenue, N.W.
Telephone: 964-6101

NTERSTATE COMMERCE COMMISSION, WASHINGTON, D.C. 20423

ducation Director: Samuel D. Bingman, Jr., Training Officer
Office: Room 1420, 1200 Constitution Avenue, N.W.
Telephone: 737-9765, Extension 7116

ATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C. 20550

areer Development and Training Officer: H.F. Blackner
Office: 1800 G Street, N.W.
Telephone: 632-4106

.S. POSTAL SERVICE, WASHINGTON, D.C. 20260

ducation Directors: Francis J. Mahaney; J.A. Matukonis, Training Division, Bureau of Personnel
Office: Room 205, 6900 Wisconsin Avenue, Chevy Chase, Md.
Telephone: 656-9125

ETERANS ADMINISTRATION, WASHINGTON, D.C. 20420

ducation Directors: Raymond L. Butler, Chief, Employee Relations and Training Division; Philip L. Loomis, Assistant Chief, Employee Relations and Training Division
Office: Room 100, Veterans Administration Main Building, Vermont Avenue and H Street, N.W.
Telephone: 389-3101

restal Building, L'Enfant Plaza, Washington, D.C. 20314

ation Director and Chairman of the Armed Forces Education and Training ory Council: Philip F. Strauss
ffice: Room 3C147, Pentagon
elephone: 697-8015 or 697-2823
gram Coordinator: William H. Johnson
ffice: Room GE222, Forrestal Building
elephone: 693-8484 or 693-8485
esentative for the University: William C. Robinson
elephone: 676-7064
to active duty military personnel and Department of Defense civilians, and to military personnel and other federal employees

strial College of the Armed Forces, Fort McNair, Washington, D.C. 20319

rector: Bernard S. Waterman
ce: Room D-281, Industrial College of the Armed Forces
phone: 693-8507

Director for the University: Harry R. Page
Office: Room 308, Hall of Government, 710 21st Street, N.W.
Telephone: 676-7250
Representative for the University: L.S. Paul
Telephone: 676-7062
Open to students and faculty of the Industrial College of the Armed Forces

Naval Research Laboratory, Washington, D.C. 20032

Education Specialist: Sylvia Wahler
Office: Navy Research Laboratory, Bldg 72
Telephone: 767-2956
Representative for the University: L.S. Paul
Telephone: 676-7062

Naval Security Station, 3801 Nebraska Avenue, N.W., Washington, D.C. 20

Education Services Officer: Danny Snare
Telephone: 282-0860

NAVAL TELECOMMUNICATIONS COMMAND, 4401 MASSACHUSETTS A
ENUE, N.W., WASHINGTON, D.C. 20370
Representative for the University: L. S. Paul
Telephone: 676-7062

Washington Navy Yard, Washington, D.C. 20374

Education Services Specialist: Lt. j.g. Ron Brown, USNR
Office: Building 92, Anacostia Naval Station
Telephone: 433-2032
Employee Development Officer: John Barber
Office: Room 202, Building 172, M and 9th Streets, S.E.
Telephone: 433-3188 or 433-3160
Representative for the University: Harvey Snyder
Telephone: 676-7028
Open to government and nongovernment employees

MARYLAND

Aberdeen Proving Ground, Md. 21005

Aberdeen Area Education Director: John L. Lichi, Chief, Educational Ser
Division
Office: Building 3146, Army Education Center, Aberdeen Proving Ground, M
21005
Telephone: (301) 278-3385
Representative for the University: Frank Dulong
Telephone: (202) 676-7029
Open to everyone by permission of the Commanding Officer of Aberdeen Pro
Ground

Andrews Air Force Base, Washington, D.C. 20331

Education Services Officer: Lloyd J. Flynn
Office: Building 3484
Telephone: 981-6377

Representative for the University: Michael G. O'Connor
Telephone: 676-7023
Open to military and civilian personnel of the Air Force and to others by permission

Defense Mapping Agency, Topographic Center, Bethesda, Md. 20315

Education Director: Gene Hastings, Chief, Training and Development Division
Office: Erskine Hall, 6500 Brooks Lane
Telephone: 227-2147
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to employees of the Defense Mapping Agency, Topographic Center, and others by permission, obtained at least one week prior to the first week of classes, from the Training and Development Division, Telephone 227-2147

Edgewood Arsenal, Md. 21010

Education Officer: Robert P. Mehr
Office: Building 4475, Edgewood Arsenal, Md. 21010
Telephone: (301) 671-2166
Representative for the University: Frank Dulong
Telephone: (202) 676-7029
Open to everyone by permission of the Commanding Officer of Edgewood Arsenal

Fort George G. Meade, Md. 20755

Education Director: Robert Rambicur
Office: Building B393, Army Education Center
Telephone: (301) 677-6421
Representative for the University: Frank Dulong
Telephone: (202) 676-7029
Open to everyone by permission of the Commanding Officer of Fort George G. Meade

National Naval Medical Center, Bethesda, Md. 20014

Education Director: J. Szabados, Head, Training and Educational Services
Office: Building 123
Telephone: 295-0493
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military and civilian personnel of the Navy, employees of the National Institutes of Health, and to others as space permits

National Oceanic and Atmospheric Administration, Rockville, Md. 20852

Education Officer: Daniel E. Bella
Office: Room 325, North Bethesda Office Center II, 5640 Nicholson Lane, Rockville, Md 20852
Telephone: 496-8481
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to all employees of the Department of Commerce and to others by permission

Naval Academy, Annapolis, Md. 21402

Coordinator for the University Programs and Education Officer: William W. Jeffries, U.S. Naval Academy
Office: Maury Hall
Telephone: (301) 267-2178

Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to everyone by permission of the Superintendent of the U.S. Naval Academ

Naval Air Station, Patuxent River, Md. 20670

Ted White, Head, Employee Development; Wanda Denton, Employee Developmen
Specialist
Office: Naval Building 463, Civilian Personnel Department
Telephone: (301) 863-3734 or 863-3735
Representative for the University: Edward B. Wright
Telephone: (202) 676-7024
Open to military and civilian personnel of the Navy and to others by permission

Naval Graduate Dental School, Bethesda, Md. 20014

Commanding Officer: RADM George D. Selfridge, DC, USN
Education Director: CAPT Robert G. Thompson, DC, USN
Office: Building 122
Telephone: 295-0064
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military personnel assigned to duty and graduate study at the Naval Gra
uate Dental School

Naval School of Health Care Administration, Bethesda, Md. 20014

Commanding Officer: CAPT William J. Green, Jr., MSC, USN
Executive Officer: CDR William Auton, MSC, USN
Office: Room 131, Building 141
Telephone: 295-1314
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military personnel assigned to duty under instruction at the U.S. Na
School of Health Care Administration

Naval Ship Research and Development Center, Annapolis, Md. 21402

Office: Building 42, Training Center
Telephone: (301) 267-2171
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to everyone by permission of the Officer in charge of the Center

Naval Ship Research and Development Center, Carderock, Md. 20007

Civilian Personnel Officer: F.D. Harman, Jr.
Office: Room 113A, Building 8
Telephone: 227-1204 or 227-1169
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military personnel and civilian employees of the Naval Ship Research a
Development Center and to others by permission

Naval Ships Engineering Command (see Prince Georges Center Building)

Parklawn Building, Rockville, Md. 20852

Education Officer: Gertrude Palder
Office: Room 3A25, 5600 Fishers Lane
Telephone: 443-3119
Representative for the University: Anne O. Currier
Telephone: 676-7249
Open to employees of the Department of Health, Education, and Welfare and to others by permission

Prince Georges Center Building (Naval Ships Engineering Center), Hyattsville, Md. 20788

Education Director: Doris B. Moore
Office: Room 118E, Civilian Personnel Office, 3700 East-West Highway
Telephone: 436-1104
Representative for the University: Douglas H. Carter
Telephone: 676-7022
Open to everyone

Social Security Administration, Baltimore, Md. 21235

Director, Center for Continuing Education: Jasper Trigg
Office: Room 4-L-11, Annex Building, Division of Training and Career Development, 6401 Security Boulevard
Telephone: (301) 594-4529
Representative for the University: Frank Dulong
Telephone: (202) 676-7029
Open to employees of the Social Security Administration and to others by permission

VIRGINIA

Arlington Hall Station, Arlington, Va. 22212

Director, Army Education Center: James Rumpler
Office: Building 316
Telephone: 692-5450
Representative for the University: William C. Robinson
Telephone: 676-7064
Open only to active duty and retired military personnel and all federal employees

Bureau of Naval Personnel (See Arlington Annex)

CNO-Navy, Arlington, Va. 22203

Education Director: Donald E. Marquart
Courses Coordinator: Tanya Fogg
Office: Room 1111, Ballston Towers #2, 801 North Randolph Street
Telephone: 692-4476 or 692-4478
Employee Development Locations Served:
Ballston Towers #2, Room 1111, Tanya Fogg, 692-4476
Jefferson Plaza, Room 158, Art Casabianca, 692-8524
Crystal Mall #3, Room 817, Patricia McGinnis, 697-4530
National Center #3, Room 4E66, Alex Lathers, 692-5610

Representative for the University: Michael G. O'Connor
Telephone: 676-7023
Open to military and civilian personnel of the Department of Defense and to other if space is available

Defense Supply Agency, Cameron Station, Alexandria, Va. 22314

Education Director: Philip C. Strang, Chief, Employee Development Branch
Office: Room 8A111
Telephone: 274-7493
Representative for the University: William C. Robinson
Telephone: 676-7064
Open to military and civilian personnel of the Department of Defense and to other by permission

Fairfax County Government, Fairfax, Va. 22030

Employee Training and Development Supervisor: Rolfe Schroeder
Office: Personnel Office, 10409 Main Street, Fairfax, Va.
Telephone: 691-3437
Representative for the University: Gerry Bassett
Telephone: (202) 676-7063
Open to employees of Fairfax County Government. Others may be admitted with permission and as space becomes available

Falls Church High School, 7521 Jaguar Trail (entrance opposite Melpar Building, Arlington Boulevard), Falls Church, Va. 22046

Assistant Principal: James Powell
Telephone: 573-4900
Representative for the University: Herbert K. Berthold
Telephone: 676-7014

Fort Belvoir, Va. 22060

Education Director: Eric Eber
Office: Building T-1483
Telephone: 664-3154 or 664-4546
Representative for the University: Michael G. O'Connor
Telephone: 676-7023
Open to military and civilian personnel of the Army and to others by permission

Fort Myer, Va. 22211

Education Director: Elizabeth J. McGowan
Office: Building 303, North Post, Post Education Center
Telephone: 697-0607
Representative for the University: Elisabeth P. Clarkson
Telephone: 676-7026
Open to military and civilian personnel of the Army and to others by permission

Hoffman Building, 2461 Eisenhower Avenue, Alexandria, Va. 22314

Education Director and Chairman of the Department of Defense Education Training Advisory Council: Philip F. Strauss
Office: Room 3C147, Pentagon
Telephone: 697-8015 or 697-2823

uilding Administrator: John Rice
Office: Room 124, Hoffman Building
Telephone: 325-0150
epresentative for the University: William C. Robinson
Telephone: 676-7064
pen to active duty and retired military personnel and all federal employees

HQ., Army Materiel Command, AMC Building, 5001 Eisenhower Avenue, lexandria, Va. 22333

ucation Director and Chairman of the Department of Defense Education and raining Advisory Council: Philip F. Strauss
ffice: Room 3C147, Pentagon
Telephone: 697-8015 or 697-2833
epresentative for the University: William C. Robinson, Room 3C155, Pentagon
Telephone: (Pentagon) 697-3141
(University) 676-7064

elpar Division of E-Systems, Inc., Falls Church, Va. 22046

ation Director: Louise Hobbs, Personnel Relations Manager
ffice: 7700 Arlington Boulevard
Telephone: 560-5000, Extension 2450

SA COMPUTER SYSTEMS COMMAND

an Sweeney, Chief, Technical Services and Training Division
Office: Melpar Annex
Telephone: 756-5488
esentative for the University: Herbert K. Berthold
ephone: 676-7014

ff Building, 5611 Columbia Pike, Falls Church, Va. 22041

ation Director and Chairman of the Department of Defense Education and g Advisory Council: Philip F. Strauss
ffice: Room 3C147, Pentagon
ephone: 697-8015 or 697-2823

ILITARY TRAFFIC MANAGEMENT AND TERMINAL SERVICE

ram Coordinator: Beth Todd
Office: Room 734, Nassif Building
Telephone: 756-1088
entative for the University: William C. Robinson
ephone: 676-7064
to active duty and retired military personnel and all federal employees

Pentagon, Washington, D.C. 20310

of the Pentagon Education Center, Chairman of the Armed Forces Educa- and Training Advisory Council, and Education Officer for the U.S. Army: F. Strauss
to the Director: Robert B. Emery, Jr.
Room 3C147, Pentagon
phone: 697-2823 or 697-6805 or 697-8015

U.S. AIR FORCE

Education Officer: Edwin Corbin
Office: Room 5E410, Pentagon
Telephone: 697-1863 or 697-7074
Representative for the University: William C. Robinson, Room 3C155, Pentagon
Pentagon Telephone: 697-3141
University Telephone: 676-7064
Open only to active duty and retired military personnel and all federal employees

U.S. Geological Survey National Center, Topographic Division, 12201 Sunrise Valley Drive, Reston, Va. 22092

Education Officer: Maurice Reed, Assistant to the Chief
Telephone: 860-6222
Representative for the University: Herbert K. Berthold
Telephone: 676-7014

U.S. Marine Corps Base, Quantico, Va. 22134

Education Officer: Major Wayne A. Babb, USMC
Office: Education Office, Building 2008
Telephone: (703) 640-2826
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to military personnel and their dependents and civilian personnel attached to the Marine Corps Base. Others may be admitted by permission

Washington Air Route Traffic Control Center (FAA), Route 7, Leesburg, Va. 22075

Education Director: Doug French, Educational Planning and Development Office
Telephone: (703) 783-0745, Extension 216
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014

Washington National Airport (FAA), Washington, D.C. 20001

Planning Development and Education Officer: William E. Freeman, Education and Training Office
Office: FAA Offices, Balcony, Main Terminal Building
Telephone: 557-2860 or 628-8781
Representative for the University: Elisabeth P. Clarkson
Telephone: 676-7026

West Springfield High School, 6100 Rolling Road, Springfield, Va. 22150

Representative for the University: Gerry Bassett
Telephone: 676-7063

Xerox International Center for Training and Management Development, Route 7, (19 miles west of Tyson's Corner) Leesburg, Va. 22075

Education Officer: John Cicero
Telephone: (703) 777-8000, ex. 6305
Representative for the University: Herbert K. Berthold
Telephone: 676-7014

OFF-CAMPUS LOCATIONS OF EDUCATION COURSES FOR TEACHERS

DISTRICT OF COLUMBIA PUBLIC SCHOOLS

James T. Guines, Associate Superintendent of Instructional Services
Office: Room 903, Presidential Building, 415 12th Street, N.W.
Telephone: 737-1062
Representative for the University: William C. Shelton, Sr.
Telephone: 676-7067

MARYLAND

Anne Arundel County Public Schools, Annapolis, Md. 21402

William Scott, Assistant in Personnel
Office: Anne Arundel County Board of Education, Green Street
Telephone: (301) 268-3345
Representative for the University: Anne O. Currier
Telephone: (202) 676-7249

Baltimore City Public Schools, Baltimore, Md. 21218

Directors of Personnel: Marvin C. Davis, Kenneth Horvath
Office: 3 East 25th Street
Telephone: (301) 467-4000, Extension 451
Representative for the University: Frank Dulong
Telephone: (202) 676-7029

Caroline County Public Schools, Denton, Md. 21629

W. C. Usilton, Director of Instruction
Office: Law Building, Market Street
Telephone: (301) 479-1460
Representative for the University: Anne O. Currier
Telephone: (202) 676-7249

Charles Tri-County Center, Waldorf, Md. 20601

Bruce Dunkle, Program Counselor
Office: Thomas Stone High School
Telephone: (301) 843-6461
Representative for the University: Anne O. Currier
Telephone: (202) 676-7249

CALVERT COUNTY PUBLIC SCHOOLS, PRINCE FREDERICK, MD. 20678

David L. Brown, Supervisor of Personnel
Office: Calvert County School Board, Dares Beach Road
Telephone: (301) 535-1700

CHARLES COUNTY PUBLIC SCHOOLS, LA PLATA, MD. 20646

Richard M. Leviner, Director of Personnel
Office: Charles County Board of Education, Health and Education Building
Telephone: (301) 934-4671

ST. MARY'S COUNTY PUBLIC SCHOOLS, LEONARDTOWN, MD. 20650

Kenneth D. Rigby, Assistant in Personnel
Office: St. Mary's County School Board of Health Building
Telephone: (301) 475-9141

Dorchester County Public Schools, Cambridge, Md. 21613

John T. Comer, Assistant Superintendent for Personnel
Office: 403 High Street
Telephone: (301) 228-4747
Representative for the University: Anne O. Currier
Telephone: (202) 676-7249

Kent County Public Schools, Chestertown, Md. 21620

Robert J. Eckert, Director of Instructional Services
Office: 400 High Street
Telephone: (301) 778-1595
Representative for the University: Anne O. Currier
Telephone: (202) 676-7249

Maryland State Department of Education, Millersville, Md. 21108

Donald Hall, Director of Training and Development Center
Office: Route 175
Telephone: (301) 923-3425
Representative for the University: Frank Dulong
Telephone: (202) 676-7029

Montgomery County Public Schools, Rockville, Md. 20850

Leonard M. Orloff, Director, Staff Development
Office: Montgomery County School Board, 850 North Washington Street
Telephone: 279-3444
Representative for the University: Anne O. Currier
Telephone: 676-7249

Prince Georges County Public Schools, Upper Marlboro, Md. 20870

Edward Turner, Director of Staff Development and In-service Training
Office: Prince Georges County School Board
Telephone: 627-4800, Extension 218
Representative for the University: Anne O. Currier
Telephone: 676-7249

Queen Anne County Public Schools, Centreville, Md. 21617

John E. Miller, Assistant Superintendent
Telephone: (301) 758-0855
Representative for the University: Anne O. Currier
Telephone: (202) 676-7249

Talbot County Public Schools, Easton, Md. 21601

William F. Best, Assistant to the Superintendent
Office: Washington and Dover Streets
Telephone: (301) 822-0330
Representative for the University: Anne O. Currier
Telephone: (202) 676-7249

Wicomico County Public Schools, Salisbury, Md. 21801

William T. Middleton III, Director of Personnel
Office: Long Avenue and Mount Herman Road
Telephone: (301) 742-5128
Representative for the University: Anne O. Currier
Telephone: (202) 676-7249

VIRGINIA

Alexandria Public Schools, Alexandria, Va. 22301

Richard B. Hills, Staff Development Officer
Office: 418 South Washington Street
Telephone: 549-1390
Representatives for the University: Gerry Bassett,
Telephone: 676-7063; John A. Morrow, Telephone: 676-7040

Arlington County Public Schools, Arlington, Va. 22201

Joseph Guter, Staff Development Officer
Office: 1426 North Quincy Street
Telephone: 558-2883
Representatives for the University: Gerry Bassett,
Telephone: 676-7249; John A. Morrow, Telephone: 676-7063

Fairfax County Public Schools, Fairfax, Va. 22150

William C. Symons, Jr., Staff Development Officer
Office: 10700 Page Avenue
Telephone: 691-3209
Representatives for the University: Gerry Bassett,
Telephone: 676-7249; John A. Morrow, Telephone: 676-7063

Falls Church City Public Schools, Falls Church, Va. 22043

Office: 7124 Leesburg Pike
Telephone: 532-1329
Representatives for the University: Gerry Bassett,
Telephone: 676-7249; John A. Morrow, Telephone: 676-7063

Loudoun County Public Schools, Leesburg, Va. 22075

T. G. Sowards, Staff Development Officer
Jane O. Ashton, Supervisor, Elementary Education
Office: Loudon County School Board, 20 Union Street
Telephone: (703) 777-2221
Representatives for the University: Gerry Bassett,
Telephone: 676-7249; John A. Morrow, Telephone: 676-7063

Prince William County Public Schools, Manassas, Va. 22110

William Helton, Director, Extension Education
Office: Tudor Lane
Telephone: (703) 791-3113
Representatives for the University: Gerry Bassett,
Telephone: 676-7249; John A. Morrow, Telephone: 676-7063

TIDEWATER CENTER

Director, George Washington University Tidewater Center: Robert C. Sedwick
Office: 2019 Cunningham Drive, Hampton, Va. 23666
Telephone: (804) 838-8444
Open to any qualified individual
Serves the cities in the Tidewater area of Virginia and the following governmen
installations:

Camp Elmore, Norfolk, Va. 23511

Education Officer: Capt. T. Catana, USMC
Telephone: (804) 444-5476

Fort Eustis, Va. 23604

Education Director: Michael A. Yannitello
Telephone: (804) 878-5508

Fort Lee, Va. 23801

General Education Director: Leland Slaydon
Telephone: (804) 734-2605

Fort Monroe, Va. 23351

Education Director: William R. Foley
Telephone: (804) 727-2454

Fort Story, Virginia Beach, Va. 23459

Education Director: E.F. Bolick
Telephone: (804) 428-1111, Extension 2151

**Guided Missile School/Fleet Anti-Air Warfare Training Center, Dam Nec
Virginia Beach, Va. 23461**

Educational Adviser: W.R. Hudgins
Telephone: (804) 425-4473
Educational Director (Base): LCDR H. Ludwig
Telephone: (804) 425-4184

Langley Air Force Base, Va. 23365

Education Services Officer: Robert J. Dewey
Telephone: (804) 764-5757

NASA-Langley Research Center, Langley Field, Hampton, Va. 23365

Head, Training and Education Services Branch: Malcolm P. Clark
Telephone: (804) 827-2611

Naval Air Station, Norfolk, Va. 23511

Educational Services Officer: Lt. W. Staniszewski, USN
Telephone: (804) 444-3291

Naval Air Station, Oceana, Virginia Beach, Va. 23460

Educational Services Officer: Lt. j.g. A. Carro, USN
Telephone: (804) 425-2613

Naval Amphibious Base, Little Creek, Norfolk, Va. 23521

Educational Services Officer: Ensign Betsi Jones, USN
Telephone: (804) 464-7811

Naval Supply Center, Norfolk, Va. 23512

Training Director: George Green
Telephone: (804) 444-4912

U.S. Atlantic Fleet, U.S. Naval Base, Norfolk, Va. 23511

Educational Services Officer: LCDR B.G.Windom, USN
Telephone: (804) 444-6945

U.S. Naval Regional Medical Center, Portsmouth, Va. 23708

Training Officer: CDR Harry P. Miller, USN
Telephone: (804) 397-6541, Extension 561

U.S. Naval Station, Norfolk, Va. 23511

Educational Director: LCDR W.F. Herrin, USN
Telephone: (804) 444-7272

COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES OF THIS CATALOGUE, under the alphabetically a
ranged names of the departments of instruction, are listed the courses of i
struction. Courses carrying the designation "Campus Course" are normal
offered only on campus. The courses are subject to change. The Universi
reserves the right to withdraw any course announced.

EXPLANATION OF COURSE NUMBERS

COLLEGES AND SCHOOLS OTHER THAN ENGINEERING AND APPLIED SCIENCE

First-group courses.—Courses numbered from 1 to 100 are planned fo
students in the freshman and sophomore years. With the approval of th
adviser and the dean, they may also be taken by juniors and seniors. In certa
instances, they may be taken by graduate students to make up undergradua
deficiencies or as prerequisite to advanced courses, but they may not be cre
ited toward a higher degree.

Second-group courses.—Courses numbered from 101 to 200 are planned fo
students in the junior and senior years. Except for Accounting courses tha
may be taken for graduate credit only upon the approval of the dean and th
instructor at the time of registration. Such approval is granted only with th
provision that students must complete additional work in order to receiv
graduate credit.

Third-group courses.—Courses numbered above 200 are planned primari
for graduate students. They are open, with the approval of the instructor, t
qualified seniors; they are not open to other undergraduates. Qualified senior
registering for Accounting, Business Administration, Health Care Administra
tion, Management Science, or Public Administration courses must have a 3.0
average, the prior approval of the department chairman who is responsible fo
the graduate course, the prior approval of the faculty adviser, and the pri
approval of the Dean of the School of Government and Business Administration
Nondegree students who have not completed a Bachelor's degree may not en
roll in graduate courses offered by the School of Government and Busines
Administration.

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Courses numbered from 1 through 199 are planned for undergraduate credit, through certain courses may be taken for graduate credit when arrangements are approved in advance by the instructor and the Dean. Courses numbered 200 to 300 are planned for graduate credit and may in certain instances be taken by qualified undergraduate students. Courses numbered from 301 to 400 are primarily for doctoral students.

SEMESTER HOURS OF CREDIT

The number of semester hours of credit given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the name of the course. Thus, a year course giving 3 hours of credit each semester is marked (3-3), and a semester course giving 3 hours of credit is marked (3). A semester hour usually consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

ABBREVIATIONS

In the description of courses in this catalogue, the following abbreviations are used:

Acct	Accounting
AmCiv	American Civilization
Anth	Anthropology
ApSc	Applied Science
Art	Art
BiSc	Biological Sciences
BAd	Business Administration
Cart	Cartography
Chem	Chemistry
CE	Civil Engineering
Chin	Chinese
Clas	Classics
CSci	Computer Science
Econ	Economics
Educ	Education
EE	Electrical Engineering
Engl	English
EAd	Engineering Administration
EngS	Engineering Science
EnHe	Environmental Health
ForS	Forensic Sciences
Fren	French
Geod	Geodesy
Geog	Geography and Regional Science
Geol	Geology
Germ	Germanic Languages and Literatures
HCA	Health Care Administration
Hist	History
HKLS	Human Kinetics and Leisure Studies
Ital	Italian
Jour	Journalism
LAm	Latin American Studies
Mgt	Management Science
Math	Mathematics
ME	Mechanical Engineering
Mus	Music
Ocea	Oceanography
OR	Operations Research
Phar	Pharmacology
Phil	Philosophy
Phys	Physics
PSc	Political Science
Psyc	Psychology
PAd	Public Administration
Rel	Religion
Slav	Slavic Languages and Literatures
Soc	Sociology
Span	Spanish
SpEd	Special Education
SPDR	Speech and Drama
Stat	Statistics
TCom	Telecommunication Operations

Accounting

Chairman: A.J. Mastro, Professor of Accounting; Government 302, Telephone 676-6055

Accounting courses numbered below the 200 level may not be taken for graduate credit.

1–2 Introductory Accounting (3–3)

Basic understanding of accounting concepts, procedures, analyses, and reports; the accounting measurement and communication of significant economic and financial data. Prerequisite to Acct 2: Acct 1. Students who have received credit for Acct 115 cannot receive credit for Acct 1–2.

101 Cost and Budgetary Control (3)

Cost behavior and volume-profit relationships, responsibility accounting, standard costs, flexible budgets, cost structures for control and motivation, relevant costs, cost concepts. Prerequisite: Acct 1–2. Students who have received credit for Acct 193 or 215 cannot receive credit for Acct 101.

111 Financial Statement Analysis (3)

The analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors. Prerequisite: Acct 1–2.

115 Survey of Financial Accounting (3)

Development, presentation, and interpretation of financial accounting data necessary to the management process. Students who have received credit for Acct 1–2 cannot receive credit for Acct 115.

121 Intermediate Accounting (3)

In-depth study of accounting functions and basic theory: acquisition of assets and services, income and equity accounting, preparation and analysis of financial statements. Prerequisite: Acct 1–2.

132 Accounting Theory (3)

Current thought as reflected in the pronouncements of leading professional and accounting research associations, major contributions to accounting literature. Prerequisite: Acct 121.

141 Governmental Accounting (3)

Appropriation, encumbrance, and fund accounting for governmental and institutional entities. Prerequisite: Acct 1–2.

144 Federal Accounting (3)

Accounting procedures in the federal government, with emphasis on agency-level accounts and accounting support for cost-based budgets. Prerequisite: Acct 141.

161 Federal Income Taxation (3)

Federal income tax concepts applicable to individuals and corporations; differences between tax accounting and financial accounting.

171 Auditing (3)

Principles and procedures of auditing: generally accepted auditing standards, internal control, audit objectives and reports, form-preparation-s of audit work papers, audit evidence. Prerequisite: Acct 121.

181 **Accounting Systems** (3)
Organization and use of accounting information: origination, classification, control, and reporting; development, design, and installation of accounting systems; accounting communication patterns. Prerequisite: Acct 101, 171.

191 **Advanced Accounting** (3)
Application of accounting theory to special areas: consolidated statements, business combinations, earnings per share, foreign exchange, price-level adjusted statements, source and application of funds. Prerequisite: Acct 121.

193 **Business Budgeting** (3)
Principles and procedures in the development, installation, and operation of a system of budgetary control to aid management. Prerequisite: Acct 1–2. Students who have received credit for Acct 101 cannot receive credit for Acct 193.

215 **Survey of Managerial Accounting** (3)
Study of the nature, analysis, and interpretation of accounting reports primarily from the management point of view. Prerequisite: Acct 1–2 or 115. Students who have received credit for Acct 101 cannot receive credit for Acct 215.

231 **Contemporary Accounting Theory** (3)
Accounting principles and concepts and recent theories concerned with the valuation and amortization of assets and determination of income. Prerequisite: 6 semester hours of accounting.

241 **Accounting and Related Disciplines** (3)
Interrelationships of accounting and behavioral sciences, economics, mathematical methods, operations research. Prerequisite: 6 semester hours of accounting.

262 **Business Income Taxation** (3)
Federal income tax concepts applicable to corporations, partnerships, and their owners; emphasis on tax planning factors in business decisions and tax research.

275 **Contemporary Auditing Theory and Procedures** (3)
Study of auditing concepts: generally accepted auditing standards, application of statistical sampling to auditing, audit of electronic data processing systems. Prerequisite: Acct 1–2 or 115.

276 **Management Planning and Control** (3)
Integrative case study approach to management systems for planning, control, and decisions: value indices for organizational sub-units, transfer pricing, contemporary control systems, accounting framework and cycle. Prerequisite: Acct 1–2 or 115.

282 **Accounting Information Systems** (3)
Development and application of accounting system theory, including analysis, design, and implementation. Integration of automatic data processing, accounting systems, and management information systems. Prerequisite: Acct 1–2 or 115.

296 **Seminar in Accounting** (3)
(Formerly Acct 295)
Selected accounting studies: critical analysis and evaluation developed in seminar discussions and papers. Prerequisite: Acct 1–2 or 115.

American Civilization*

Director: H.F. Gillette, Jr., Assistant Professor of American Civilization, P-10, Telephone 676-6070

71–72 **Introduction to American Civilization** (3–3) (Campus Course)
Themes and issues in American civilization since colonial times, with emphasis on their contemporary importance.

226 **Ethnic Identity and the Melting Pot** (3)
An approach to understanding American civilization through the study of some of its ethnic and racial groups. The approach will be interdisciplinary, using historical, literary, and sociological materials.

271 **Seminar: Research and Teaching in American Civilization** (3)
Consideration of American studies as an area for research and teaching; introduction to bibliography.

Anthropology

Chairman: R.L. Humphrey, Jr., Associate Professor of Anthropology; X-11, Telephone 676-6075

Departmental prerequisite: Anth 1–2 is prerequisite to all other courses in Anthropology except Anth 158 and 162. This prerequisite may be waived by permission of instructor.

1–2 **Introductory Anthropology** (3–3)
Anth 1: survey of man's origin, physical evolution, and culture history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior.

153 **Psychological Anthropology** (3)
Relevance of psychological theories to human evolution and the cross-cultural study of personality. Cultural determinants of personality formation and mental health.

154 **Mythology and Folklore** (3)
Traditional verbal expression of supernatural or social beliefs; metaphoric thought; verbal art.

155 **Primitive Religion** (3)
Conceptions of the supernatural in nonliterate societies. Examination of religious beliefs and practices. Emphasis on religious process and change.

157 **Primitive Social Organization** (3)
The analysis of the social organization of primitive peoples; kinship, economic, and political systems.

171 **Native Peoples of North America** (3)
Comparative study of Indian groups representative of each of the culture areas of the continent.

* Administered by the American Studies Program.

185 **Latin American Archaeology** (3)

The culture history of pre-Columbian Latin America from the Paleo-Indian period through the Spanish Conquest, emphasizing the origin and development of Latin American high civilizations.

201 **Seminar: the Nature and Scope of Anthropology** (3)

Survey of the development of anthropological thought; examination of the subject matter, methodology, and theoretical approaches of anthropology, especially as they relate to contemporary societies.

202 **Seminar: Recent Trends in Anthropology** (3)

Major topics of interest in contemporary anthropology since the mid-20th century will be taken up in order, stressing current journal and monograph materials.

---

rman: W.A. MacDonald, Professor of Art and Archaeology; Building H, 2000 G N.W., Telephone 676-6085

1–32 **Survey of Western Art** (3–3)

Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art. Art 31: prehistoric to Gothic art. Art 32: proto-Renaissance to contemporary art.

1–72 **Introduction to the Arts in America** (3–3)

Painting, sculpture, and architecture of America, with selected references to crafts and popular arts. Art 71: from colonial beginnings to the republican age. Art 72: from early 19th century to the present.

109 **19th Century Art in Europe** (3)

Painting and sculpture.

110 **Contemporary Art** (3)

Painting and sculpture in 20th century Europe.

112 **Art of Egypt and the Ancient Orient** (3)

Study of the art of Mesopotamia, Anatolia, Egypt, and Persia.

113 **Baroque Art in Italy** (3)

Development of painting, sculpture, and architecture in 16th and 17th century Italy.

115 **Christian Iconography** (3)

Origins and development of Christian symbols and themes from early Christian to modern times.

117 **Medieval Art I** (3)

Architecture, sculpture, and painting of the early Christian and Byzantine periods.

120 **Art of China and Japan** (3)

Architecture, painting, and sculpture of China, Korea, and Japan.

141 **Interior Decoration** (3)
Principles of decoration dealing with furniture designs and ensemble lay-out, draperies, color, accessories, and lighting.

145 **Folk Arts in America** (3)
Ceramics, woodcarving, ironwork, decorative painting, weaving, and other crafts.

146 **Principles of Museum Work** (3)
Introduction to the history and development of museums: problems of museum administration, connoisseurship, cataloguing, installation, conservation, and educational service.

155 **Etruscan Art and Archaeology** (6)
Art and Archaeology program in Italy.

156 **20th Century American Art** (3)
An examination and study of the wide range and variety of artistic expression in American painting, sculpture, and architecture from the late 19th century to the present. Given in conjunction with New York University Sunrise Semester program via TV. Off-campus credit only; credit not applicable to campus degree programs.

203 **Primitive Art** (3)
Arts of prehistoric and primitive man in Europe, pre-Columbian Americas, Oceania, and Africa.

242 **Etruscan Art and Archaeology** (6)
Art and Archaeology Program in Italy.

Biological Sciences

Chairman: A.H. Desmond, Professor of Zoology; Bell 314, Telephone 676-6090

BIOLOGY

3–4 **Introductory Biology for Nonscience Majors** (3–3) (Campus Course)
Lecture (2 hours), laboratory (2 hours). Survey of biological principles, emphasis on man as a functional organism in his environment. Prerequisite to BiSc 4: BiSc 3. Material fee, $15 a semester.

11–12 **Introductory Biology for Science Majors** (4–4) (Campus Course)
Lecture (3 hours), laboratory (3 hours). Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Required of all prospective biology, botany, and zoology majors. Prerequisite to BiSc 12: BiSc 11. Material fee, $18 a semester.

Business Administration

Chairman: Guy Black, Professor of Business Economics; Government 302, Telephone 6115

51 Introduction to Business (3)
Structure, activities, and problems of business enterprise; its contribution to the individual and to society; careers in business.

101 The Business Environment (3)
Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues.

102 Fundamentals of Management (3)
Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking.

105 Personnel Management (3)
The labor force and labor markets. Industrial personnel and manpower programs, organization and policy in personnel activities.

106 Leadership in Personnel Management (3)
(Formerly Problems in Personnel Management)
A study of the philosophy, principles, policies, and programs for effective personnel management and industrial relations as portrayed by case studies drawn from business and government. Prerequisite: BAd 105 or permission of insctructor.

107 Collective Bargaining (3)
American unionism and collective bargaining: economic, social, and public policy considerations. The negotiation and administration of collective bargaining agreements. Prerequisite: BAd 105 or permission of instructor.

113 Real Estate (3)
Principles of urban real estate practice; leasing and property management, valuation, appraisal, financing, taxation, urban growth, urban renewal.

121 Fundamentals of Insurance and Risk Management (3)
Functions of insurance and risk management in business enterprise.

122 Insurance and Estate Planning (3)
Insurance and estate programming in providing protection and estate development; disposition of the individual estate.

131 Business Finance (3)
Analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, sources of funds, capital budgeting, stockholder relationships. Prerequisite: Acct 1–2; Econ 1; Math 30, 31; Stat 51.

132 International Business Finance (3)
Principles, practices, problems, and institutions of international finance. Emphasis on international financial markets, exchange rates, balance-of-payments restraints, and governmental policies. Prerequisite: BAd 131.

138 Investment and Portfolio Management (3)
Theory and principles of security analysis and portfolio management, in-

cluding analysis of the national economy, industry, company, and security markets. Risk-reward and computer-aided analysis. Prerequisite: Acct 1–2, BAd 131.

141 **Basic Marketing Management** (3)
Marketing and marketing management, consumer and demand analysis, retailing, wholesaling. Emphasis on major decision areas and tools. Prerequisite: BAd 102, Econ 1–2.

143 **Marketing Research** (3)
Principles and practices of marketing research; emphasis on basic methods and techniques, sources and interpretation of data, and presentation of results. Prerequisite: BAd 141.

158 **Physical Distribution Management** (3)
Distribution from shipper's point of view: problems of plant location, inventory control, warehousing; traffic management emphasized, including private carriage. Prerequisite: Econ 1–2.

161 **Commercial Law** (3)
Fundamental concepts and principles of law encountered in business activity; contracts, bailments, agency, sales, negotiable instruments, bankruptcy, other topics. Basic legal considerations in business decision-making.

171 **Principles of Transportation** (3)
Impact of intercity transportation systems on society. Emphasis on modal differences in development, economic characteristics, and regulation. Prerequisite: Econ 1–2.

172 **Public Utilities** (3)
Legal and economic meaning of public utility concept; development, services, economic characteristics, rate-making, and regulation with emphasis on electric, gas, and telephone industries. Prerequisite: Econ 1–2.

173 **Transportation Systems Management** (3)
Comparative study, from the standpoint of various carrier modes, of management problems common to all modes of domestic and international transportation. Prerequisite: BAd 171, Econ 1–2.

174 **Urban Transportation** (3)
Problems of developing balanced transportation systems for urban areas—area needs, modal evaluation, cost effectiveness, finance, and marketing. Prerequisite: BAd 171, Econ 1–2; or equivalent.

175 **Introduction to International Business** (3)
Physical movement of goods in international business; conditions essential for successful trading; export shipment, documentation, procedural problems. Emphasis on ocean marine insurance and export traffic management policy. Prerequisite: Econ 1–2.

178 **International Business Policy and Operations** (3)
Analysis of overseas projects according to purpose and type of organization; development and management of overseas operations in different world areas. Prerequisite: BAd 175 or permission of instructor.

181 **Manufacturing Production** (3)

Basic principles and methods of manufacturing production. Manufacturing facilities, plant and equipment. Illustrations selected from various process and fabrication industries. Prerequisite: Math 51, 52; Stat 51 or equivalent.

198 **Business Policy and Administration** (3)

Terminal undergraduate course in Business Administration. Integration of functional activities in arriving at over-all business policy decisions. Prerequisite: BAd 102, 105, 131, 141, 181.

202 **Relations of Government to Business** (3)

Regulatory and promotional activities of the government, independent regulatory agencies, antitrust activities, monetary and fiscal policy, regulation of labor-management relations.

208 **Personnel Management and Industrial Relations** (3)

Survey of personnel management practices and procedures, including labor-management relations.

209 **Seminar: Personnel Management** (3)

Industrial personnel and manpower management, research in advanced problems.

211 **Leadership and Executive Development** (3)

Theories of managerial leadership; issues and problems associated with leadership in large organizations and at higher management levels; executive selection and development. Prerequisite: Mgt 201 or permission of instructor.

212 **Unionism and Collective Bargaining** (3)

The American labor movement. Collective bargaining and the conduct of labor relations under collective bargaining agreements.

213 **Current Issues in Unionism, Collective Bargaining, and Labor Relations** (3)

Current problems and issues. Prerequisite: BAd 212.

220 **Administration of Research and Development** (3)
(Formerly Mgt 230)

Examination of technological, political, and economic factors affecting the R&D environment; operational aspects; management problems in military, governmental, and industrial organizations; project selection, resource allocation, personnel, planning and control, measurement and evaluation.

225 **Seminar: Manufacturing Production** (3)

Production technology, including new processes, materials, products, equipment, and facilities. Implications of emerging technology in managing the production function. Prerequisite: BAd 181 or permission of instructor.

239 **Seminar: Administration of Research and Development** (3)
(Formerly Mgt 239)

Individual and/or group in-depth research projects dealing with various phases of research and development management. Topic will vary each time the course is offered according to the emerging technology, current

operational problems, and student interest. Prerequisite: 6 to 9 semester hours of research and development management or permission of instructor.

231 **Financial Decision-making** (3)
Functions and objectives of financial management, asset management, problems of internal financial analysis, rate-of-return analysis, financial forecasting, problems of capital demand and supply. Prerequisite: Acct 115 or equivalent, BAd 131.

232 **Capital Resource Management** (3)
Problems of capital acquisition, costs, rationing, structure; dividend policy. Prerequisite: BAd 231.

233 **International Business Finance** (3)
Analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: BAd 131 or equivalent.

235 **Financial Management** (3)
Problems of financial management; planning financial structure, obtaining and managing capital, issuing and placing securities, administering income, security arrangements. Prerequisite: Acct 215, Mgt 201.

237 **Investment Analysis** (3)
Risk-reward analysis of security investments including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory and computer methods. Prerequisite: BAd 131.

238 **Seminar: Investment and Portfolio Management** (3)
Portfolio management theory, application, and computer modeling. Independent research on investment analysis and portfolio management with emphasis on theory, cases, and computer applications. Prerequisite: BAd 237.

241 **Marketing Management** (3)
Marketing management problems; market segmentation, product planning, channels of distribution, advertising, personal selling, sales promotion, pricing and development of integrated marketing programs.

243 **Seminar: Marketing Research** (3)
Research as an aid to decision-making and increased efficiency in marketing, marketing research process, critical appraisal of methods and results, applications.

248 **International Marketing** (3)
Organization for international marketing, demand analysis, product development and policies, marketing structure and trade channels, advertising and promotion problems and policies, pricing, and legal aspects. Effective international marketing strategy.

255 **Multinational Corporations in the World Economy** (3)
(Formerly International Business in Perspective)
The nature and order of magnitude of international business; global patterns of trade and investment; international and national institutional policy issues, trends.

256 **Seminar: International Trade** (3)

Classical and modern concepts of international trade theory, instruments and institutions of trade policy, barriers to trade, preferential treatment and trading blocs, trends and issues.

257 **Business Policy in the Multinational Firm** (3)
(Formerly Operation of the Multinational Firm)

International market entry and expansion; operating policies, procedures, and problems of multinational companies; developing executives for international business. Prerequisite: advanced Master's degree standing.

261 **Applied Microeconomics** (3)
(Formerly Managerial Microeconomics)

Applications of economic theory and statistics to business decisions involving demand, production, cost, profits, investments, and inventories. Prerequisite: Econ 217, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor.

262 **Applied Macroeconomics** (3)
(Formerly Managerial Macroeconomics)

Use of economic theory and statistics in business forecasting; interpretation of economic trends and developments; analysis of governmental economic policies. Prerequisite: Econ 218, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor.

275 **Seminar: Transportation** (3)

Problems and special areas of interest in transportation. Prerequisite: BAd 171 or permission of instructor.

279 **Purchasing and Materials Management** (3)

Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, source selection, buying practices, policies, and ethics.

280 **Procurement and Contracting** (3)

Overview of procurement and contracting; emphasis on federal government buying policies, practices, and procedures.

282 **Government Contract Administration** (3)

Surveillance and management of contract performance. Measurement of progress; specification interpretation; quality assurance; changes, negotiation, and adjustment; financial considerations; property; terminations; regulatory and policy concerns. Prerequisite: BAd 280 or permission of instructor.

283 **Pricing and Negotiation** (3)

Scope and objectives of negotiated procurement; preparation, conduct, and recording of negotiations; analysis of cost, price, profit, investment, and risk; cost principles; incentives; relationship of contract type to work requirements; techniques of negotiation. Prerequisite: BAd 280 or permission of instructor.

285 **Systems Procurement and Project Management** (3)

Development and procurement of major systems. Project management and its impact on the procurement process. Procurement planning. Prerequisite: BAd 280 or permission of instructor.

295 Research Methods (3)
(Formerly BAd 293 Business Research)
Theory and practice in research methodology. Data sources and gather-
ing, research models and designs, analysis and testing, controls, interpre-
tation and presentation of findings.

297 Business Policy Formulation (3)
Analysis of operational situations and policy issues. Developing and im-
plementing solutions to managerial problems. Prerequisite: advanced
Master's degree standing.

299 Thesis Seminar (3) (Campus Course)
Examination of thesis standards, research philosophy and methodology

300 Thesis Research (3)

Cartography*

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodesy, Cartography, and
Oceanography, Telephone 676-6185 or 946-3557

1 Cartography I (3)
(Formerly Cart 1–2 Introduction to Cartography [3–3])
Introduction to the fundamental concepts and practical applications
cartography.

2 Cartography II (3)
(Formerly Cart 1–2 Introduction to Cartography [3–3])
Aerial photography, modern topographic and hydrographic mapping and
charting, thematic maps, map reliability, planning and design and repro-
duction. Prerequisite: Cart 1.

103 Introduction to Remote Sensing (3)
(Formerly Cart 103–4 Photo-interpretation [3–3])
Photo-interpretation—history and applications. Interpretation of topo-
graphic, vegetative, hydrologic, and man-made features. Civil and milita
applications. Prerequisite or concurrent registration: Geod 17.

104 Photo-interpretation (3)
(Formerly Cart 103–4 Photo-interpretation [3–3])
Applications to urban planning and urban-industrial patterns. Use
satellite imagery and remote sensing data. Color aerial photographs a
underwater photography. Prerequisite: Cart 103.

107 Physiography (3)
Development of physiographic concepts; the earth's crust, weatherin
climate, and denudation; stream, shore, wind, and ice processes; glac
tion; physiographic regions.

* Affiliated with the Department of Geography and Regional Science.

108 **Climatology** (3)

Causes for climate and weather, air mass movements, water mass movements, physical features of boundaries. Tropics, subtropics, humid and dry continentals, subarctics.

111 **Cartographic Techniques** (3)

Techniques and procedures, field methods, evaluation of source material, use of scribing and contact screens in color separation, shaded relief, and reproduction. Lectures and laboratory. Laboratory fee to be announced. Prerequisite: Cart 2.

112 **Advanced Cartography** (3)

Automated cartography, including computer-assisted map compilation, statistical mapping, automated color separation, and revision systems. Aerospace cartography. Prerequisite: Cart 111.

120 **Computer Mapping** (3)

Methods of quantitive computer mapping. Through practical computer exercises, techniques are applied to a variety of mapping situations. Laboratory fee to be announced.

125 **Marine Cartography** (3)

Exploring the extended and imaginative symbology required to depict a visually opaque environment characterized by sparsity of data; the thermatic aspects of oceanographic mapping. Prerequisite: Cart 2.

130 **Techniques in Remote Sensing** (3)
(Formerly Remote Sensing)

Theory and applications. Instrumentation. Data management. Automatic and interactive data interpretation. Courses or experience in the natural and/or physical sciences recommended.

140 **Introduction to Sensitometry** (3)

Construction of tone reproduction curves; optimization of photographic presentation; evaluation of photo materials, equipment and systems. Prerequisites: Math 30, Phys 1 or comparable experience.

142 **Mechanics and Kinetics of the Photographic Process** (3)

Light, optics and photometry as applied to the photographic process; sensitometry and densitometry for quality control and assurance; density slicing; image enhancement; auto- and self-dodging; antivignetting masks.

emistry

---

an: A.D. Britt, Associate Professor of Chemistry, Corcoran 104, Telephone
30

ICAL SCIENCE

3–4 **Contemporary Science** (3–3) (Campus Course)

For nonscience majors. Lecture (2 hours), laboratory (3 hours). Contemporary topics from the physical sciences are integrated to introduce the nonscience major to the basic methods and achievements of physical science. Laboratory fee, $17 a semester.

5–6 Contemporary Science (4–4)
Nonlaboratory course for off-campus students only. Survey covering topics in contemporary science: population control, pollution, drugs, food additives, etc.

CHEMISTRY

11–12 General Chemistry (4–4) (Campus Course)
Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Elementary course in general chemistry, including qualitative analysis. Prerequisite to Chem 11: one year of high school algebra. Prerequisite to Chem 12: Chem 11. Laboratory fee, $23 a semester.

Chinese*

Chairman: Chung-wen Shih, Professor of Chinese; Library 613, Telephone 676-7106

1–2 Beginning Mandarin Chinese, Level I (3–3) (Campus Course)
Classroom (3 hours), laboratory (1 hour). Fundamentals of grammar and pronunciation with graded reading and practice in writing. Prerequisite to Chin 2: Chin 1. Laboratory fee, $17.50 a semester.

3–4 Beginning Mandarin Chinese, Level II (3–3) (Campus Course)
Classroom (3 hours), laboratory (1 hour). Continuation of grammar and spoken Chinese with more emphasis on the written language and reading. Prerequisite to Chin 3: Chin 2 or equivalent. Prerequisite to Chin 4: Chin 3. Laboratory fee, $17.50 a semester.

Economics

Chairman: C.T. Stewart, Jr., Professor of Economics; C-617, Telephone 676-615

Departmental prerequisite: Except for Econ 217–18 and 220, Econ 1–2 is prerequisite to all other courses in Economics.

1–2 Principles of Economics (3–3)
Lecture (2 hours), recitation (1 hour). Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2.

101 Intermediate Microeconomic Theory (3)
Analysis of supply, demand, and pricing.

102 Intermediate Macroeconomic Theory (3)
Theories of national income determination and growth.

121 Money and Banking (3)
Nature of money, credit, commercial banking, and other financial institutions in the U.S. monetary system.

* Administered by the Department of East Asian Languages and Literatures.

217–18 **Survey of Economics** (3–3)

For graduate students in fields other than economics. Econ 217: price theory. Econ 218: income and employment theory. Departmental prerequisite waived.

220 **Survey of Principles and Issues in Economics** (3)

For students in the Master of Science in Administration degree program. Survey of economic theory and its application to contemporary economic problems. Departmental prerequisite waived.

ducation

man: Donald Linkowski, Associate Professor of Education; C-514, Telephone 6940

partmental prerequisite: A degree from an accredited institution and ade- professional preparation are prerequisite to courses in Education numbered 201 to 400.

112 **Educational Measurement** (3)

Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123.

128 **Children's Literature** (3)

Lecture (2 hours), field work (2 hours). Newer books for children and the children's classics, contribution of literature to child development.

205–6 **The Curriculum** (3–3)

For experienced teachers. Educ 205: curriculum foundations and issues, comparison of curriculum patterns. Educ 206: curriculum development in subject areas, group consideration of student problems.

207 **Curriculum Materials** (3 to 6)

For experienced teachers. Construction of courses of study and classroom teaching aids, with direct application to students' situations.

208 **Human Development** (3)

Consideration of human development and behavior throughout the life span; emphasis on practical implications of relevant interdisciplinary research.

209 **Child Development** (3)

Interdisciplinary approach to child development and behavior. Practical implications of research in disciplines contributing to knowledge about childhood.

210 **Adolescent Development** (3)

Interdisciplinary approach to adolescent development and behavior. Practical implications of research in disciplines contributing to knowledge about adolescence.

212 **Quantitative Methods I: Measurement** (3)

Basic measurement techniques; selection, administration, and interpreta-

tion of standardized tests; construction, selection, and interpretation of questionnaires, personality inventories, and other data-gathering instruments used in research.

213–14 **History of Education** (3–3)

Educ 213: European backgrounds of American education. Educ 214: evolution of the American school system.

216 **Education of Slow-learning Children** (3)

Identification, nature, and needs of slow-learning elementary and junior high school children. Emphasis on diagnosis and treatment of learning difficulties.

217–18 **Philosophy of Education** (3–3)

Educ 217: to help students formulate a personal philosophy of education. Educ 218: social foundations of education—forces that shape policies and offerings of the school.

219 **Elementary School Classroom Procedures** (3)

Current theories of teaching and learning and their application to teaching acts and strategies of elementary school teachers.

223 **Foundations of Reading Instruction** (3)

Historical and psychological background; evaluation of recent methods, materials, and techniques in teaching reading; demonstrations of diagnostic and teaching techniques. Specific areas to be announced in *Schedule of Classes.*

224 **Diagnostic Teaching of Reading** (3)
(Formerly Reading Problems)

Elementary school reading difficulties; classroom and clinical techniques in testing and teaching. Prerequisite: one or more years of recent teaching experience and a previous course in reading or language arts.

226 **Reading in Secondary School and College** (3)

Methods, techniques, and materials necessary for testing and developing efficient reading skills, including skills in content subjects; organizing and evaluating reading programs.

227 **Basic Issues in Elementary Education** (3)

Identification, definition, and analysis of some of the most important problems facing the contemporary American elementary school.

228 **Instructional Areas in Elementary Education** (3)

Current trends and research on reading, language arts, social studies, mathematics, science, music, art, and physical education.

229 **Administration of Elementary Education** (3)

For experienced teachers and administrators. Achieving instructional objectives, organizing and servicing teaching activities, coordinating school and community life.

231 **Secondary School Classroom Procedures** (3)

Current classroom practices: teacher-pupil planning, group procedures, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature.

232 **Supervision of Elementary Education** (3)
For experienced teachers and administrators with two or more years of teaching experience. Review of modern supervisory concepts, including practices in the operation of the elementary school.

233 **Audio-visual Education** (3)
Lecture (2 hours), laboratory (1 hour). Selection, evaluation, and use of audio-visual materials; administrative problems in care, operation, maintenance, and use of such materials and equipment. Material fee, $7.

235 **Analysis of Teaching** (3)
Teaching as work: diagnosing learning skills, program planning and implementation, feedback information on both student and program.

236 **Introduction to Education Technology** (3)
Consideration of historical perspective, process, instrumentation, and implementation of self-instructional systems.

237 **Systems Approach to Instructional Design** (3)
Application of systems techniques to the development of an instructional program.

241 **Education of the Gifted** (3)
For classroom teachers. Nature and discovery of giftedness, provisions for the gifted in regular classes, experimental projects.

243 **Human Relations in Education** (3)
Principles and practices in human relations between and among learner, teacher, other school personnel, and parents.

245 **School and Community** (3)
The school as an important member of a team of social agencies that builds the community.

247 **Adult and Preprofessional Technical and Occupational Education** (3)
Development, current concepts, agencies involved, problems, and trends in adult vocational-technical-occupational education in the United States and foreign countries.

250 **Counseling Drug Abusers** (3)
Counseling theory and practice applied to drug abusers. Crisis intervention, self-help groups, and family therapy; individual and group counseling.

251 **Foundations of Counseling** (3)
(Formerly Foundations of Guidance and Personnel Services)
Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues.

252 **Organization and Administration of Guidance Services** (3)
Procedure and practice in organizing and administering school guidance and pupil personnel programs. Admission by permission of instructor.

253 **Individual Appraisal in Counseling** (3)
(Formerly Analysis of the Individual for Purposes of Counseling)
Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite: Educ 212 or equivalent.

254 **The Middle School** (3)
Development, organization, and practices; emphasis on the learner, the teacher, the administrator, the curriculum, and the setting of the school for the preadolescent.

255–56 **Secondary Education** (3–3)
Examination of historical, psychological, sociological, and philosophical bases; emphasis on prescriptive implications. Special attention to contemporary problems and practices.

257 **Career Development and Information** (3)
(Formerly Educational and Occupational Development)
Theories of career development; factors influencing the world of work; procedures for evaluating and using socio-personal, educational, and occupational information.

258 **Theories and Techniques of Counseling** (3)
(Formerly Techniques of Counseling)
Theories and practices of vocational, educational, and personal counseling. Prerequisite: 12 semester hours in guidance and counseling, including Educ 253 and 257.

259 **Secondary School Administration** (3)
For experienced teachers and administrators. Survey of administration, including practices of the modern high school.

260 **Secondary School Supervision** (3)
For experienced teachers and administrators. Review of modern supervisory concepts, including practices in schools.

263 **Human Resource Development: Training and Education** (3)
Concepts and purpose, historical backgrounds, emerging roles of human resource development personnel, program areas. Prerequisite: adequate professional preparation or experience in training, education, and development.

264 **Program Planning in Human Resource Development** (3)
Training, education, and development programs for various client systems will be planned using critical events conceptual model. Field work. Prerequisite: Educ 263 and permission of instructor.

269–70 **School Business Management** (3–3)
Educ 269: philosophy, responsibilities, and functions of the business management office in public education institutions. Educ 270: practicum in educational business management.

271 **The Teacher and School Administration** (3)
Role of federal, state, and local administrative units; school finance; legal controls; school plant; public support; improving teaching conditions.

272 **The Teacher and School Supervision** (3)
Nature, organization, human relationships, and techniques.

275 **Seminar: School Finance** (3)

Educational financial theory, practice, and control, including methods of financing.

276 **Seminar: Public Relations in School Administration** (3)

Purposes, gathering materials, disseminating agencies, publicity media, public participation in policy-making.

278 **School Law** (3)

Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of major interest to the group.

283 **Higher Education in the United States** (3)

History, scope, purpose, present status, programs and trends in higher education in the United States.

284 **Administration of Higher Education** (3)

Government, organization, and administration of colleges and universities; duties of trustees and administrators.

285 **Student Activities** (3)

Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student council, interscholastic contest; attention to sponsorship, participation, finance, and evaluation.

291 **Planning the School Plant** (3)

Selection of sites; evaluation of existing buildings; utilization of present facilities; adaptation to curricular needs; building, operation, and maintenance problems.

293-94 **Research and Independent Study** (3–3)

Individual research under guidance of a staff member. Program and conferences arranged with an instructor.

295 **Quantitative Methods II: Research Procedures** (3)

Required of all candidates for graduate degrees in Education. Analysis of scientific approaches to problems in education; evaluation of research techniques. Prerequisite: Educ 212 or equivalent.

297 **Personnel Administration** (3)

Organization and administration of personnel programs for educational institutions. Basic philosophy, principles, responsibilities, and functions.

298 **Seminar: Personnel Administration** (3)

Research: policies, rules and regulations, staff organizations, negotiations.

299-300 **Thesis Research** (3–3)

Required of M.A. in Ed. degree candidates writing Master's theses.

316 **Curriculum Developments in Elementary School Social Studies** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school social studies curriculum. Admission by permission of instructor.

317 **Curriculum Developments in Elementary School Science** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school science curriculum. Admission by permission of instructor.

320 **Curriculum Developments in Elementary School Mathematics** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school mathematics curriculum. Admission by permission of instructor.

354 **Counseling of Minority Groups** (3)

Consideration of problems and approaches related to counseling cultural and racial minorities in American society; emphasis on counseling the disadvantaged in urban areas.

355 **Counseling in Groups** (3)

Principles of group dynamics as related to interaction within groups. Techniques and practice in group counseling.

357 **Personal and Social Adjustment** (3)
(Formerly Mental Hygiene)

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents.

370 **College Students and Their Community** (3)

Survey of literature on the characteristics, behavior, and attitudes of the contemporary college student; college student interaction with his environment. Admission by permission of instructor.

371 **Principles and Practices in College Teaching** (3)
(Formerly Introduction to College Teaching)

General principles, methods, techniques, and experimental instructional media for teaching at the college and university level.

372 **Internship in College Teaching** (3 to 6)

Supervised experience in a selected area of college teaching. Prerequisite: Educ 371. Admission by permission of instructor.

373 **The Community-Junior College** (3)
(Formerly The Junior-Community College)

The two-year college as it relates to secondary education, four-year colleges, and universities. Objectives, curricula, students, faculty, legal concerns, and special problems of two-year colleges.

374 **Current Issues in Higher Education** (3)

Prerequisite: Educ 283, 284.

375 **Foundations of a College Student Development Program** (3)

College student development as an integral part of higher education programs.

380 **Sensitivity Training: Laboratory Method** (3)

A sensitivity learning experience in human relations using unstructured group experience, individual feedback, experimentation, and practice. Admission by permission of Department, prior to registration.

381 **Adult Learning** (3)
Learning theories as applied to adults in individual and group learning transactions; effect of age on learning; psychological, physical, and social environment in adult education situations.

382 **Methods and Techniques of Adult Learning** (3)
Methods, techniques, and devices for adult learning; developing action-oriented learning situation in adult learning programs.

383 **Counseling of Adults** (3)
Theories and practical applications of personal counseling, emphasizing distinct needs of adults and young adults in occupational settings; for supervisors, instructors, and counselors in military, government, business, and industry settings.

384 **Evaluation of Adult Learning Programs** (3)
Measurement and evaluation of adult learning programs in school and nonschool agencies—business, industry, government, voluntary organization, and community.

386 **Current Issues in Adult Learning Programs** (3)
For M.A. in Ed. degree candidates. Current issues and trends in the fields of adult education and human resource development. Admission by permission of instructor.

387 **Administration of Adult Learning Programs** (3)
Program administration, staff recruitment and development, fiscal operations, facilities, and maintenance of effective community relations.

389 **Consultant-Client Relationship in Human Resource Development** (3)
Examination of the consulting process, consultant-client behaviors, and dilemmas using theory and field experience for individual and organizational development. Prerequisite: Educ 264, 280 *Program Planning in Adult Education (3);* or approval of instructor.

390 **Legal Problems in Higher Education** (3)
Investigation of legal problems in higher education related to administration, students, faculty, and academic program.

391 **College and University Curriculum** (3)
Development, patterns, creative design, issues, problems, evaluation, and trends in the higher education curriculum.

392 **Financing Higher Education** (3)
Analysis of private, state, and federal revenue sources; student aid, program budgets, and financial methods and practices.

393 **Practicum in Higher Education** (3 to 6)
Supervised field experiences in higher education; reports and conferences. Admission by permission of instructor.

394 **College and University Governance** (3)
Organizational and administrative structures, patterns, and relationships in higher education. Prerequisite: Educ 284.

395 **Problems and Practices in Educational Administrative Organization** (3 to 6)
(Formerly Problems and Practices in School Administrative Organization)
Application of principles and practices concerned with change and evaluation of educational administration.

399 **Seminar: Applied Educational Administration** (3 to 6)
Application of the theories and principles of administration to the public schools. Student participation with guidance by recognized regional practitioners.

400 **Special Workshop in Education** (arr.)
Topics to be announced in *Schedule of Classes*. May be repeated for credit.

Engineering and Applied Science

Coordinator of NASA-Langley Graduate Program: S.W. Yuan, Professor of Engineering and Applied Science, Tompkins 118, Telephone 676-6749
Program Adviser of Naval Ship Research and Development Center, Carderock, Md.: J.E. Feir, Professor of Civil Engineering, Tompkins 109, Telephone 676-7526
Program Adviser of Naval Ship Research and Development Center, Annapolis, Md.: S.W. Yuan, Professor of Engineering and Applied Science, Tompkins 118, Telephone 676-6749

APPLIED SCIENCE

115 **Engineering Analysis III** (3)
Solution of engineering problems using concepts from probability and statistics, including random variables, distribution functions, mathematical expectation, point and confidence interval estimation, hypothesis testing, correlation, and regression. This methodology applied to problems in structural design, bioengineering, manufacturing processes, product quality, equipment reliability, engineering management, and societal engineering. Prerequisite: Math 32.

211 **Analytical Methods in Engineering I** (3)
Engineering applications of the theory of complex variables including contour integration, conformal mapping, inversion, integral and boundary-value problems. Prerequisite: approval of Department.

212 **Analytical Methods in Engineering II** (3)
Analytical methods appropriate to the formulation of engineering problems including finite dimensional vector spaces, eigenvalue problems, generalized Fourier series, tensor calculus, curvilinear coordinates. Prerequisite approval of Department.

213 **Analytical Methods in Engineering III** (3)
Analytical techniques applied to engineering problems involving wave propagation, diffusion processes, and potential distributions. Prerequisite approval of Department.

214 **Analytical Methods in Engineering IV** (3)
Introduction to variational methods in engineering including Ritz and Galerkin approximation methods for boundary-value problems. Aspects of linear integral equations arising from engineering analysis. Prerequisite approval of Department.

215 **Analytical Methods in Engineering V (3)**
(Formerly Special Topics in Engineering Analysis)
Advanced methods in solution of boundary-initial value problems in engineering, including characteristics, wave propagation, and Green's functions. Prerequisite: ApSc 213.

216 **Special Topics in Engineering Analysis (3)**
(Formerly ApSc 215)
Selected topics such as (1) perturbation techniques applied to approximate solution of nonlinear boundary and initial value problems in engineering; (2) application of singular integral equations in problems of mechanics; (3) applications of elements of functional analysis in engineering and science. Prerequisite: approval of Department.

IL ENGINEERING

168 **Introductory Soil Mechanics (3)**
Engineering properties of soils; analysis of lateral earth pressures, bearing capacity, foundations, and slope stability. Prerequisite: CE 120 *Introduction to the Mechanics of Solids* (4) and ME 126 *Fluid Mechanics* (3).

191 **Metal Structures (3)**
Principles of the design of metal structures; structural elements; connections; specific problems of analysis; methods of construction. Prerequisite: CE 123 *Structural Theory* (6).

192 **Reinforced Concrete Structures (3)**
Principles of the design of reinforced concrete structures. Details of reinforcement of structural elements. Monolithic structures, precast elements, methods of construction. Prerequisite: CE 123 *Structural Theory* (6).

201 **Design of Metal Structures (3)**
Structural behavior of metal structures, conception and design of advanced structural components and systems, hysteretic behavior, plastic design principles, box type girders, cable systems, composite girders, and special topics. Prerequisite: CE 191 or equivalent.

202 **Design of Reinforced Concrete Structures (3)**
Structural behavior of reinforced concrete structures, conception and design of structural components, prestressed concrete, slabs, ultimate strength and deformation, box type girders, hysteretic behavior, safety considerations, and special topics. Prerequisite: CE 192 or equivalent.

203 **Prestressed Concrete Structures (3)**
Structural behavior and failure modes of prestressed concrete structures; design in prestressed concrete, including long-span structures, bridges, and precast systems. Prerequisite: CE 202 or equivalent.

206 **Foundation Engineering (3)**
Principles of soil mechanics and structural mechanics applied to the analysis and design of spread footings and mat foundations, pile foundations, retaining structures, including sheeting and bracing systems, and waterfront structures. Problems associated with subsurface exploration, dewatering excavations, and underpinning. Prerequisite: CE 204 *Applied Soil Mechanics I* (3) or CE 205 *Applied Soil Mechanics II* (3) or equivalent.

253 **Failure and Reliability Analysis of Engineering Structures** (3)
Operational and structural failure mechanisms; instability, fracture, and fatigue. Operational and structural safety, probability of failure. Aspects of probabilistic structural analysis, statistics of extremes, risk and reliability, optimal design criteria. Prerequisite: ApSc 115 or equivalent.

254 **Special Topics in Structural Engineering** (3)
Selected problems in structural mechanics and design: (1) thermal stresses in structural systems, (2) advanced probabilistic structural mechanics, (3) structural design for dynamic loads, (4) structural design for repeated loads, or (5) structural synthesis and optimization. May be repeated for credit. Prerequisite: CE 210 *Methods of Structural Analysis* (3), and approval of Department. Topic to annuonced in the *Schedule of Classes*.

255 **Coastal Processes** (3)
Longshore currents and nearshore circulation; coastal sediment properties and analysis, longshore transport processes and rates; sediment budget; response of beaches to wave action and structures; tidal inlets, mechanical bypassing; beach nourishment; wind transport of sandy dune stabilization, sediment tracing. Prerequisite: approval of Department.

258 **Harbor and Coastal Engineering II** (3)
Interaction between structures and waves. Analysis and design of flexible structures: piers, jetties, and protective structures; off-shore drilling platforms. Design criteria, moorings and cables, harbor operations equipment. Prerequisite: CE 257 *Harbor and Coastal Engineering I* (3); CE 252 *General Structural Dynamics* (3) or equivalent.

259 **Theory of Ship Motions and Sea Loads** (3)
Hydrodynamics of bodies oscillating in calm water. Cylinders in the free surface. Forces and moments on a fixed body in waves. Linear-strip theory for six degrees of freedom motions for ships and ocean structures in regular waves. Nonlinear-roll motions. Dynamic loads on floating vehicles and fixed structures in a seaway. Prerequisite: CE 271 or equivalent.

260 **Random Processes in Ocean and Coastal Engineering** (3)
Basic principles and concepts of spectral analysis, linear systems, and the superposition principle; statistical prediction and probability function, Rayleigh distribution and its properties, threshold crossing problems, prediction of extreme values; related topics dealing with the statistical prediction of ocean waves, motions and wave forces of ocean structures. Prerequisite: ApSc 115 or equivalent.

261 **Analysis of Plates and Shells** (3)
Bending and stretching of thin elastic plates under loading with various boundary conditions, continuous plates and plates on elastic foundations, theory of folded plate structures. Theory of curved surfaces; general linear bending theory and its simplification to membrane theory; bending stresses in shells of revolution, shallow shell theory. Specific applications. Prerequisite: graduate status.

263 **Theory of Structural Stability** (3)
General criteria for stability; buckling of elastic and inelastic columns and frames; torsional and lateral buckling; variational methods. Buckling of plates and shells under static loads; stability of stiffened structures; effects of imperfections and boundary conditions. Prerequisite: graduate status.

271 Theoretical Marine Hydromechanics (3)

Introductory course designed to acquaint the student with some physical concepts and mathematical tools of theoretical marine hydromechanics. Derivation of the fundamental equations and boundary conditions of a fluid media; application of potential-flow theory to fluid motion around two- and three-dimensional bodies; perturbation concepts. Introduction to thin-ship and slender-body theories. Derivation of force and movement of bodies moving in calm and disturbed water. Prerequisite: approval of Department.

274 Mechanics of Water Waves (3)

Irrotational theory for deep- and shallow-water waves, reflexion, refraction, diffraction, attenuation. Water waves of finite amplitude: shallow-water theory, tides, bores, long-waves theory, conoidal and solitary waves. Wave generation by wind; state-of-the-art based on correlation between theory and measurements. Wave-breaking and reflexion. Prerequisite: ME 221 or equivalent and permission of instructor.

275 Special Topics in Ocean Engineering (3)

Selected topics: (1) marine aspects of viscous-flow theory, (2) interfacial (internal) waves, (3) applied random processes in ocean and coastal engineering, or (4) other selected topics. Prerequisite: approval of Department. May be repeated for credit.

TER SCIENCE

201 Introduction to Computer Systems I (3)

Introduction to programming digital computers in a macro-assembly language and higher-level procedural languages; techniques in machine control and memory addressing. Characteristics of different computer structures and the programming of such machines. Introduction to the structure of compiler languages; parsing of compiler language statements. Characteristics and choice of data processing language. Prerequisite: CSci or EE 51 *Applications of Computers* (3) or equivalent, assembly language programming experience, and permission of instructor.

202 Introduction to Computer Systems II (3)

Introduction to combinational and sequential logic networks; analysis and synthesis of switching circuits using Boolean algebra; minimization techniques in the design of logical circuits; number systems and arithmetic in digital computers, digital computer architecture and the design of functional sub-units; design of memory, arithmetic, and units comprising a digital computer; information flow, timing, and control in large digital computers. Prerequisite: CSci 201 or permission of instructor.

231 Finite State Machines (3)

Abstract algebraic foundations using set theory, including operators, relations, mappings, homomorphisms, lattices, and mathematical systems such as groups and semigroups. Sequential machine (finite state machines) theory including state representation and identification. Moore and Mealy machines, reduction and equivalence of completely and incompletely specified machines, partitions and covers, and composition and decomposition. Prerequisite: CSci 202 or CSci or EE 153.

237 **Computing Systems** (3)

Organization of large digital computer systems. Design of high-speed arithmetic units. Random access and associative memories; rotation storage devices; computer control and interrupt structures. Input-output channels and interfacing problems. Communications in digital computers. Introduction to multiple access and time-sharing systems. Prerequisite: EE 154 *Ditigal Computer Design* (3) or CSci 202.

263 **Digital Computer Programming Systems** (3)

Design of computer systems software. Use of a macro-assembler and job control language. Design of assemblers and loaders. Concepts of multiprogrammed job control including linking, loading, linkage-editing, relocatability, and status switching. Design of dispatchers and monitors. Communications between components of an operating system. Input-output programming and control. Design of utility programs. Prerequisite: CSci 214 *Data Structures* (3) or permission of instructor.

285 **Approximation of Functions and Data Representations** (3)

Review of linear spaces; least squares, orthogonal functions; nonlinear techniques, gradient search methods; parameter estimation with discrete data; Tchebysheff approximation; approximation and curve fitting by Spline functions and Bernstein polynomials.

ELECTRICAL ENGINEERING

152 **Introduction to Digital Computers** (3)

Introduction to the use of structure of minicomputers and larger computers. Boolean algebra and the design of combinational switching circuits. Number systems, codes, and arithmetic operations in digital computers. Digital computer subsystems and their interconnections. Interfacing equipment to a minicomputer; timing, control, and electronic requirements. Introduction to programming analog computers; analog computer components; analog-to-digital conversion. Prerequisite: EE 157 *Machine and Assembly Language Programming* (3).

153 **Design of Switching Systems** (3)

Switching algebra and Boolean logic; sets, relations, and lattices. Analysis and design of switching devices; design of combinational logic networks. Minimization techniques and decomposition methods. Electronic implementation of logic; contact networks, symmetric functions, and threshold logic. Reliable design and fault-detection tests. Number systems and codes, geometric interpretation, error detecting and correcting codes; encoders and decoders. Logic and electronic design of functional digital units. Sequential circuits and iterative networks. Minimization and transformation of sequential machines; structure of sequential machines: partitions and covers. State identification and fault-detection experiments. Prerequisite: EE 152 or permission of instructor. May be taken for graduate credit.

201 **Natural Modes and Transients in Electrical Systems** (3)

Transient response and natural modes of electrical systems; techniques for analyzing systems with periodic and aperiodic inputs and outputs; sampling.

202 **Linear System Theory I** (3)

Graph theory and its application to networks and systems; system description in time and frequency domain; linear spaces and linear operators

mathematical representation of linear systems; analytical and computer solutions of the state equations; transient and steady-state response. Prerequisite: graduate status.

203 **Linear System Theory II** (3)

System properties; controlability and observability of linear systems; sensitivity and stability analyses. Irreducible realizations of rational transfer-function matrices; canonical forms, state feedback, and state estimators. Linear composite systems. Prerequisite: EE 202.

204 **Stochastic Signals and Noise** (3)

Probability, random variables, characteristic functions; transformations of random variables and applications; sequences of random variables, linear mean-squared estimation; stationary estimation, stationary random processes, correlation functions, power spectrum; output of linear systems with stochastic inputs; Gaussian processes. Applications drawn for communications, control theory, computer science.

224 **Quantum Electronics of Masers and Lasers** (3)

Basic concepts from quantum mechanics: Einstein coefficients; inversion and pumping mechanisms; rate equations. Resonators. He-Ne laser; organic dye lasers; injection lasers. Nonlinear interactions in lasers. Prerequisite: EE 222 *Physical Electronics II* (3) or equivalent.

235 **Antennas** (3)

General solution of Maxwell's equations in terms of current sources, the far field approximations, radiation from current distributions, field equivalence theorems, the geometrical optics approximation, aperture antennas, receiving antennas, the theory of arrays, and applications to specific antennas and antenna types. Prerequisite: EE 207 *Electromagnetic Theory and Applications II* (3).

241 **Information Theory** (3)

Measure of information, noiseless coding; communication channels, channel capacity, the noisy channel coding theorem; bounds on the performance of communication system; the Gaussian and binary symmetric channel; feedback communications systems; rate-distortion theory. Prerequisite: EE 204.

242 **Coding Theory** (3)

Error-correcting codes; bounds on the performances of error-correcting codes, group codes; syndrome decoding; cylic codes, their encoding and decoding; Galois fields; BCH codes, burst correction, and threshold-decodeable codes; performance calculations.

243 **Communication Theory I** (3)

Optimum receivers for vector channels and for the additive white Gaussian noise channel; correlation detectors, matched filters; coherent and noncoherent detection and their error probabilities for simplex, orthogonal, and coded systems; bounds on the performance of communications in Gaussian noise; comparison of communications systems. Prerequisite: EE 204 or equivalent.

244 **Communication Theory II** (3)

Schemes for efficient signaling for data sequences; effects of quantizing at the receiver; detection of such signals in colored noise; detection of sto-

chastic signals; the innovations approach in detection and estimation problems; signaling over fading channels and the optimum receivers; diversity techniques and their performances. Prerequisite: EE 243.

245 **Signal Detection and Estimation Theory** (3)

Statistical detection theory, hypothesis testing, sequential detection, estimation theory, maximum likelihood and Bayes methods, estimation of signal parameters and continuous wave forms, Wiener and Kalman filters, applications to the design of optimum receivers, adaptive systems. Prerequisite: EE 241, 244; or equivalent.

*250 **Telecommunication Systems Concepts** (3)

Essential elements of an electrical communication system, speech, TV, and data signals, spectrum, bandwidth, sampling. Amplitude, frequency and pulse code modulation and comparative performance. Multiplexing schemes, communication quality standards and objectives. Signal power, noise power, distortion, and channel capacity. Probability, traffic theory, reliability, voice, TV, and data transmission. Telecommunication, microwave radio, cable, and satellite communications systems.

*251 **Survey of Telecommunication Systems** (3)

Design of a communications link for voice, TV, and data. Loading; the switched telephone network. Transmission system layout and major design considerations. Over-all system design of microwave radio system. Radiowave propagation fundamentals. Satellite communications, factors affecting the choice of orbit and orbital separation of satellites, satellite transponder. Major design consideration and values of significant parameters for a typical satellite communications link. Over-all design of a cable communication system. Digital transmission and digital terminals. Wideband data transmission. Frequency allocation.

273 **System Optimization** (3)

Parameter optimization problems; theory of minima and maxima; optimization problems for dynamic systems; calculus of variations; the maximum principle and the Hamilton-Jacobi equation; optimization problems with constraints; optimal feedback systems; numerical solution of optimal problems. Prerequisite: EE 202 or equivalent.

274 **Nonlinear Systems** (3)

Definition of linear and nonlinear systems; introduction to approximate analysis of nonlinear systems—describing functions, Krylov and Bogoliubov's asymptotical method and Tsypkin's locus. Forced oscillations—jump resonance; stability analysis—Liapunov's criterion, Luré's problem and Popov's method. Prerequisite: EE 203.

298 **Research** (arr.)

Research as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit.

*EE 250 and 251 cannot be applied toward a Master's or Doctor's degree in the School of Engineering and Applied Science.

INEERING ADMINISTRATION

11–12 Engineering Administration (3–3)

Comprehensive and systematic study of the administrative process; industrial, scientific, and engineering environments. Planning: objectives, prediction, policies, plans and characteristics of plans. Organizing: theory of organization, structure, authority, specialization, delegation, staff and committees. Directing: leadership, managing human and material resources. Controlling: setting standards, evaluating performance, using system feedback data for correction and improvement. Students who receive credit for EAd 211–12 cannot receive credit for EAd 201 *Management for Scientists and Engineers* (3).

241 Construction Management I (3)

Contract negotiations: aspects of contracts and specifications important to management. Construction estimating and cost allocation in heavy and building construction; budgeting and accounting concepts.

269 Elements of Decision-making and Problem-solving (3)

History and orientation of quantitative methods; concept of quantitative decision-making; decision criteria under certainty, risk, and uncertainty; game theory; utility; the time factor; replacement models. Prerequisite: EAd 170 *Basic Quantitative Methods for Engineering Administration* (3) or equivalent.

NEERING SCIENCE

03–4 Probability and Statistics of Metrology (3–3)

Probability distributions, discrete and continuous distributions; sampling; combinatorial analysis; stochastic processes; conditional probability; correlation; analysis of variance; design and analysis of experiments; Latin Square experiments; factorial experiments; block and lattice design. Prerequisite: ApSc 115 or equivalent.

221 Theory of Elasticity I (3)

Introduction to Cartesian tensor analysis; deformation, stress, linear constitutive relations, formulation of boundary value problems, energy principles; torsion and bending of prisimatical rods, plane problems in elastostatics. Prerequisite: approval of Department.

231 Solid State for Engineers (3)

Crystal structures, crystal diffraction, reciprocal space, elastic constants, elastic waves, lattice vibrations, thermal properties, electronic structure, energy bands, semiconductors, superconductivity, magnetic properties, optical properties. Prerequisite: approval of Department.

232 Advanced Materials Science (3)

Elastic properties; imperfections: point defects, dislocations, dislocation networks, grain boundaries; anelasticity; microplasticity and plasticity; creep; work hardening; alloy hardening: solid solutions, precipitates. Prerequisite: approval of Department.

234 Composite Materials (3)

Principles of composites and composite reinforcement; micromechanics and failure; interface reactions in various composites; reinforcing mate-

rials; structure of composites—fiber-reinforced polymers, filler-reinforced polymers, fiber-reinforced metals, directionally solidified alloys, dispersion-strengthened metals. Prerequisite: approval of Department.

237 **Quantum Mechanical Treatment of Metals** (3)
Elements of quantum mechanics, including Schroedinger equation and elementary perturbation theory. Applications to basic processes in the theory of solids: lattice waves, electron states, electron-electron and electron-phonon interactions. Boltzmann equation and transport properties. Fermi surfaces; theory of superconductivity. Prerequisite: EngS 231 or approval of Department.

239 **Physical Ceramics** (3)
Crystal chemistry and the systematic study of the structure of ceramic materials; solid reactions occurring at elevated temperatures; sintering, vitrification, diffusional mechanisms and effects; reaction rate theory; elastic, anelastic, and plastic properties of ionic and covalent solids; viscoelastic behavior of vitreous and vitreous-solid systems; phase equilibria of ceramic systems. Prerequisite: approval of Department.

240 **Fracture Mechanics** (3)
Fundamentals of brittle fracture, Griffith theory and extensions, mechanics of fracture, linear elastic systems, plasticity considerations, fracture toughness, engineering analysis, notch strength analysis with limit approach, crack propagation laws, fatigue, fracture testing, comparison of recent continuum theories. Prerequisite: approval of Department.

263 **Atmospheric Physics for Engineers I** (3)
Atmospheric radiation: phenomenological equation of transfer; solutions to the transfer equation; optical, physical, and chemical properties of atmospheric constituents; remote sensing and the direct inversion problem; energy transfer and atmospheric structure. Prerequisite: approval of Department.

270 **Introduction to Acoustics** (3)
Waves in an infinite homogeneous medium; sound transmission in layered media and through structure, source, and dipole fields; sound propagation in ducts and enclosures; sound propagation through atmosphere and acoustic absorptions, acoustic circuit elements; acoustic transducers; introduction to acoustic measurements. Prerequisite: approval of Department.

271 **Random Process Theory I** (3)
Random processes. Stationarity and ergodicity; mean-square calculus; auto- and cross-correlations and spectra; random processes in linear systems; mean-square estimation, prediction and filtering; zero and level crossings and peak distributions; applications in aerospace sciences. Prerequisite: EngS 203 or approval of Department.

272 **Random Process Theory II** (3)
Discrete and continuous state Markov-processes; chains, queues, diffusion and passage problems; linear and nonlinear estimation and stochastic control; estimation of correlations and power spectra; applications in communication theory; scattering from random surfaces; stochastic linearization and stability. Prerequisite: EngS 271.

273 **Time Series Analysis** (3)
Harmonic analysis of deterministic and random signals; auto- and cross-correlations and spectra; periodogram, Blackman-Tukey and direct filter

ing methods of spectral estimation; effects of finite length and digitization; variability; coherence. Fast Fourier transform techniques; applications in modern technology. Prerequisite: EngS 271 or approval of Department.

274 **Noise and Vibration Control** (3)

Introduction to the physical effects of noise and vibration on man, practical sources of noise and their control; building noise, ventilation system noise, mechanical equipment noise, aircraft noise; automobile and truck noise; factors affecting vibration levels and vibration control by structural design, damping, and isolation. Prerequisite: EngS 270, ME 215.

275 **Advanced Theoretical Acoustics** (3)

Acoustic wave motion, several methods of solving inhomogeneous wave equation, theory of sources, scattering and diffraction, duct propagation, introduction to acoustically coupled systems, acoustics in moving media. Prerequisite: ApSc 213, EngS 270.

276 **Acoustical and Mechanical Measurements** (3)

Characteristics of signals, basic transducer elements, standards of measurements and calibrations, signal recording and processing, acoustical and vibration instrumentation, vibration exciters, vibration testing techniques, flow mechanical measurements. Prerequisite: EngS 270, ME 215.

277 **Physical Acoustics** (3)

Concepts of continuum mechanics and thermodynamics, wave propagation in real media, thermal viscous and relaxational attenuations, piezoelectric crystals and ultrasonics, wave propagation in rigid and deformable porous media. Prerequisite: EngS 275.

278 **Psychological and Physiological Acoustics** (3)

Auditory system and its response to sound, experimental methodology in psychoacoustics, subjective response to sound, environmental noise and its evaluation, criteria for the prediction of noise nuisance, nonauditory system response to noise. Prerequisite: approval of Department.

279 **Human Factors in Engineering** (3)

Man-machine interface, effects of physical stresses on human behavior and performance, life support system, learning and conditioning of physical stresses.

280 **Special Topics in Acoustics** (3)

Current methods and problems in acoustics. Topics chosen from such areas as aerospace noise generation and control; instruments and procedures for acoustics measurements; and responses of structures, people, and communities to noise. Prerequisite: approval of Department.

284 **Numerical Methods in Engineering** (3)

Review of programming fundamentals; matrix operations and solution of simultaneous equations; difference methods and computer solution of ordinary and elliptic partial differential equations; numerical solution of initial and boundary-value problems in heat transfer, fluid flow, and structural mechanics. Prerequisite: approval of Department.

285 **Finite Element Methods in Engineering Mechanics** (3)

Formulation of the finite element method through the use of variational principles for structural and continuum mechanics problems. Plane stress, plane strain, three-dimensional elasticity, plate bending, thermal conduc-

tion and potential flow. Techniques of constructing and assembling the characteristic elemental matrices, computer implementation of the finite element method. Prerequisite: approval of Department.

286 **Analysis and Design of Thin-walled Structures** (3)
Statics of thin-walled beams and panels, force interplay between stiffeners and skin in the analysis and design of stiffened thin-walled structures; strength and stiffness of locally buckled stiffened structures; classification of loads and safety factors; different considerations governing the design of thin-walled structures; critical evaluation of various structural design procedures. Prerequisite: approval of Department.

287 **Automated Design of Complex Structures** (3)
Review of techniques for automated design including mathematical programming, fully stressed design, and optimality criteria; application of automated design techniques to stiffened and composite shell-type structures; multiple-load conditions and design constraints. Prerequisite: approval of Department.

289 **Special Topics in Theoretical and Applied Mechanics** (3)
Selected topics in theoretical and applied mechanics: (1) nonlinear mechanics, (2) nonlinear mechanics of continua, (3) wave propagation in solids, or (4) other appropriate topics. Prerequisite: approval of Department. May be repeated for credit.

298 **Research** (arr.)
Basic research projects as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3)

310 **Aeroacoustics** (3)
General theory of aerodynamic sound generation and propagation, Lighthill's formulation of jet noise, similarity laws, supersonic and subsonic jet noise, boundary-layer noise, fan and compressor noise, helicopter noise, sonic booms. Current problems in aeroacoustics. Prerequisite: EngS 27[illegible]

311 **Nonlinear Acoustics** (3)
Finite amplitude waves and waves in moving stratified media. Interaction between linear and nonlinear waves, wave propagation through nonlinear media, applications to transmission of sound through ducts with flow and absorbing walls. Prerequisite: approval of Department.

312 **Theory of Random Vibration** (3)
Response of linear systems to stationary random inputs. Failures resulting from dynamic response. Response of space vehicle structures to intense noise fields, measurement, and application. Prerequisite: EngS 27[illegible], ME 215.

313 **Structural Acoustic Interaction** (3)
Coupled response of structures to sound, system of infinite extent, system of finite extent, sound radiation from structure, sound transmission through structure. Panel response to turbulent boundary-layer excitation. Sound radiation from mechanically excited structure vibration. Prerequisite: EngS 270, 312.

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

399 **Dissertation Research (arr.)**

Limited to Doctor of Science candidates. May be repeated for credit.

CHANICAL ENGINEERING

215 **Theory of Vibrations (3)**

Damped and undamped natural vibrations, transient response and response to harmonic and periodic excitation, natural vibration of discrete and continuous systems; integral formulation of eigenvalue problems, response by modal analysis, approximate methods, influence of secondary effects and constraints, damped systems. Prerequisite: approval of Department.

216 **Structural Dynamics (3)**

Methods of solving vibration problems: differential equation, Rayleigh-Ritz finite element. Free and forced vibration of structural components: straight, curved, and thin-walled beams; plates and shells; sandwich construction. Vibration of built-up structures. Structural wave motion, wave motion in periodic structures. Prerequisite: ME 215.

221 **Intermediate Fluid Mechanics (3)**

The continuum, kinematics of fluids; stress tensor, strain and rate-of-strain tensor; fundamental equations of the flow of viscous compressible fluids; Laplace's equations; source, sink, and doublet; vortices, Biot-Savart theorem and the flow field of a vortex; spherical and cylindrical harmonics; methods of singularity distributions, complex-variable methods; laminar flow of viscous incompressible fluids; boundary-layer concept. Prerequisite: approval of Department.

222 **Applied Fluid Dynamics (3)**

Subsonic lifting line wing theory, direct and inverse solution of the lifting surface theory; singularity method for wing-body combination; vortex lift theory; effects of camber and twist distribution; transonic airfoils, effect of wing sweep, area ruling concept; supersonic linearized wing theory; similarity rules. Prerequisite: ME 221 or equivalent.

227 **Viscous Flow (3)**

Exact solution of Navier-Stokes equations; the small Reynolds number approximations, laminar boundary-layer theory and the techniques for its solution, stability of laminar flows; Reynolds theory of turbulent stresses, applications to internal and external flows, turbulent boundary-layer theory; applications to heat-transfer problems; flow separation. Prerequisite: ApSc 213; ME 221 or equivalent.

235 **Compressible Flow (3)**

Thermodynamics and physical properties of gases, fundamental equations of a compressible inviscid fluid, small perturbation theory, expansions in Mach number and thickness parameters, second-order shock shapes, role of entropy in supersonic flow, shock wave interactions, hodograph transformation, Kármán-Tsien and other model gases, conical flows, transonic flow theory, method of characteristics, rotational nonisentropic flows. Prerequisite: ApSc 213; ME 221 or equivalent.

237 **Propulsion I (3)**

Basic concepts of propulsion: energy transformations in propulsive flows; gas dynamics of combustion, detonation processes; nonuniform flows, mixing; intakes, additive drag; mechanics of flow induction; drag and thrust

generation; multiple-flow thrust generators; thrust recovery and augmentation; the propulsion spectrum. Illustrative examples will include propellers, turbojets, turbofans, ramjets, and rockets. Prerequisite: approval of Department.

238 **Propulsion II** (3)

Advanced propulsion concepts: nonsteady flows with viscosity, heat exchanges, and entropy gradients; discontinuities and interaction in nonsteady flow; gas dynamics of nonsteady combustion; static, dynamic, and cryptosteady pressure exchange; energy equalizers and dividers; nonsteady-flow thrust generators. Topics for discussion will include a variety of new flow induction and propulsion concepts. Prerequisite: ME 237.

248 **Seminar: Aircraft Design I** (3)

Problem of designing an aircraft to certain specifications. Regulatory restraints and requirements, state-of-the-art limitations, computer-aided design, integration of aircraft components, economic considerations, and iterations to final configuration to obtain specified mission profile. Prerequisite: approval of Department.

270 **Aerodynamics of Flight Vehicles** (3)

Aerodynamic loads on flight vehicles, interference effects, application of aerodynamic theory to aircraft design, studies of aircraft dynamics and performance. Prerequisite: ME 222 or equivalent.

271 **VTOL Aircraft Technology** (3)
(Formerly V/STOL Flight Dynamics)

Fundamental principles of VTOL aircraft; hovering performance based on momentum theory; analysis of jet-induced interference effects; transition aerodynamics; theoretical stability and control and correlation with flight data; ground-effect theory and experiment; handling qualities criteria; elements of instrument approach and landing problem. Prerequisite: approval of Department.

273 **Principles of Automatic Flight Control** (3)

Design of aeronautical instrumentation and feedback controls; mathematical models of sensors, controllers, and actuators; theory of feedback control, stability, accuracy, and speed of response; equalization effects of nonlinearities and noise. Prerequisite: approval of Department.

274 **Principles of Flight Guidance** (3)

Guidance requirements for atmospheric flight; implementation of guidance systems using inertial and radio techniques in conjunction with automatic data processing. Prerequisite: ME 273.

275 **Stability and Control of Vehicles** (3)

Derivation of equations of motion, Euler transformations and direction cosines, stability derivatives and linearization of equations of motion, stability of linear systems with application to longitudinal and lateral dynamics, Laplace transform techniques and frequency response analysis. Prerequisite: approval of Department.

276 **Mechanics of Space Flight** (3)

First- and second-order Hamilton-Jacobi perturbation theory applied to artificial satellites, von Zeipel's methods, special and general perturbation theories for third-body perturbations. Differential correction of orbits by

weighted least squares and minimum variance techniques. Comparison of various filtering techniques as applied to orbit determination and other space flight parameter estimation. Prerequisite: approval of Department.

279 **Special Topics in Flight Sciences** (3)

Current problems and methods in high angle of attack stability and control. Nonlinear aerodynamics in the angle of attack region above the stall. Influence of aircraft design and nonlinear aerodynamic parameters on the post-stall stability and control of aircraft. Employment of current experimental techniques and development of equations pertaining to developed spin and recovery characteristics. Prerequisite: ME 275 or approval of Department.

280 **Advanced Thermodynamics** (3)

Statistical significance of the entropy concept, conditions of equilibrium, equilibrium of heterogeneous systems. Application of thermodynamic formalism to magnetic, electric, and solid systems; equilibrium of ionized gases; the Nernst postulate and the third law of thermodynamics. Prerequisite: graduate status.

281 **Nonequilibrium Thermodynamics** (3)

Limitations of equilibrium thermodynamics, entropy production, phenomenological equations and linear laws; postulates of nonequilibrium thermodynamics, formulation of the equations of nonequilibrium systems, statistical foundations, stationary nonequilibrium states; selected applications. Prerequisite: ME 280.

290 **Kinetic Theory of Gases** (3)

Equation of state and physical properties for gas composed of discrete particles; relation of kinetic theory to thermodynamics; Maxwell distribution of molecular velocities; Boltzmann H theorem. Molecular interactions, free paths, collision rates, scattering coefficients. Introduction to diffusion, viscosity, heat conduction; imperfect gases; flow of gases at low density. Prerequisite: ME 280.

297 **Special Topics in Fluid Mechanics** (3)

Prerequisite: approval of Department.

298 **Research** (arr.)

Research as arranged. May be repeated for credit.

9–300 **Thesis Research** (3–3)

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit.

lish

rman: J.P. Reesing, Jr., Professor of English; Stuart 407, Telephone 676-6180

Before students are registered in Engl 10, they are tested in the minimum essentials of vocabulary, spelling, grammar, standard usage, and writing skill. Those students who show marked superiority may, upon passing further tests, be exempted from one or both halves of the English Composition course; those who are inadequately prepared for Engl 10 will be given permission to register for Engl 9 on campus. Engl 9 or 10 is prerequisite to all other courses in English.

ENGLISH COMPOSITION

9 English Composition: Language as Communication (3)
(Campus Course)

Intensive course in English grammar and composition for students inadequately prepared for Engl 10. Begins with detailed instruction, drill, and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 10. Engl 9 meets five hours a week and carries 3 semester hours of credit. Total fee, $320.05 (tuition of $28; plus additional fee of $25; University Center fee, $13.05).

10 English Composition: Language as Communication (3)

Study and practice of expository techniques; emphasis on the rhetorical complexities of unity, development, organization, and coherence, by analysis of selected current prose; library research procedure.

11 English Composition: Language and the Arts and Sciences (3)

Study and practice of expository and argumentative techniques; emphasis on the rhetorical complexities of the sentence and of diction, and on logical thought, by analysis of selected books on the nature of language and of the arts and sciences. Prerequisite: Engl 9 or 10.

20 The Writing of Reports (3)

Theory and practice in the writing of technical reports. Prerequisite: Engl 9 or 10 and 11.

HUMANITIES

43–44 Classical Humanities (3–3)

Interdisciplinary study of the origins of Western thought. Reading and intensive class discussions of selections from the Bible and of five works each semester from the following authors: Homer, Hesiod, Aristophanes, Plato, Aristotle, Aeschylus, Euripides, Sophocles, Herodotus, Thucydides, Lucretius, Marcus Aurelius, Epictetus, Polybius, St. Augustine. Background lectures on the major intellectual, artistic, economic, and social movements.

45–46 Humanities in the Modern World (3–3)

Interdisciplinary study of modern Western thought from the Renaissance to the 20th century. Reading and intensive class discussion of five works each semester from the following authors: Machiavelli, Pope, Voltaire, Rousseau, Goethe, Tolstoy, J.S. Mill, Zola, Nietzsche, Kierkegaard, Freud, Kafka, Koestler, T.S. Eliot. Background lectures on the major intellectual, artistic, economic, and social movements.

ENGLISH LITERATURE

51–52 Introduction to English Literature (3–3)

Representative works by major authors studied in their historical context;

discussion of recurrent themes, and introduction to various types and forms of imaginative literature.

91–92 **Introduction to European Literature** (3–3)

Selected major works in various genres read in translation and in entirety. Engl 91: *Iliad*, *Aeneid*, and dramas from ancient to modern times. Engl 92: Thucydides, Plato, Ovid, and Dante; medieval saga and romance; prose fiction from Cervantes to Mann.

115 **Introduction to English Linguistics** (3)

Development of the English language in a historical treatment of English grammar.

ERICAN LITERATURE

71–72 **Introduction to American Literature** (3–3)

Historical survey. Engl 71: from the beginnings to the Civil War. Engl 72: from the Civil War to present.

175 **Special Topics in American Literature** (3)

ironmental Health*

further information call David A. Rowley, Assistant Dean, Graduate School of and Sciences, Telephone 676-6210

201 **Introduction to Epidemiology and Environmental Health** (3)

Open to qualified graduate students. Principles and methodology of epidemiology and biostatistics. Ecological approach to health and disease, including parasitology and mycology.

231 **Venereal Disease in the Community** (3)

A survey course to develop an understanding of venereal disease problems. Etiology, clinical manifestations, diagnosis, prevention, and control. For parents, school teachers, health personnel, and other educators.

254 **Human Ecology** (3)

Ecology—man within the framework of reference—physical and cultural anthropology, geography, sociology, urban planning, public health, and public administration.

293 **Public Health and School Health Methods and Activities** (3)

Relationship between public health and school health. The purpose of the course is to aid the teacher in presenting information in the classroom setting.

301 **Applied Epidemiology and Environmental Health** (3)

Lectures, seminars, and case studies. Epidemiological solutions to health problems of the community.

* courses are included in certain interdepartmental programs of the Master of Arts/Master Science in Special Studies degree which is under the academic jurisdiction of the Graduate School of Arts and Sciences.

Forensic Sciences

Chairman: R.C. Allen, Professor of Law, Samson Hall, Telephone 676-7397/7

201 **Serology, Microscopy, Mineralogy** (3)

Fundamental analysis of blood grouping tests and of those mate primarily identified using the microscope. Specific procedures and t niques utilized in forensic serology—from indicative color tests to bl enzyme classifications and microscopic analyses of hairs, fibers, reproductive cells. Limitations of the expert in determining blood human food grouping, and natural and synthetic fiber classification, subsequent interpretations for courts.

202 **Instrumental Analysis** (3)

Principles and application of various instrumental methods to the ex ination of criminal evidence, including chromatographic and spectrop metric techniques and mass spectrometry.

203 **Examination of Questioned Documents** (3)

Theory and principles of handwriting and handprinting, duplicating p esses, paper manufacture, and fiber analysis; studies of paper and meth of examination of questioned documents.

204 **Firearms and Tool-mark Identification** (3)

Study of methods for identifying firearms, cartridge casings, tool ma tire marks, and footprints.

*214 **Forensic Psychiatry** (3)

Introduction to the constructs of dynamic psychiatry, psychiatric tre ment, and the nomenclature of mental disorders. Consideration of pert testimony, direct examination and cross-examination in hospital tion and criminal cases.

220 **The Crime Lab, the Forensic Scientist,and the Criminal Lawyer** (3)

Survey of the forensic physical sciences; qualifications and preparation the expert witness, and his role in court in criminal and civil cases; op ation and functioning of the crime lab.

224 **Introduction to Criminal Law, Procedure, Evidence, and Legal Methods** (3)

Principles of criminal law and procedure, preparation and presentation evidence, examination of witnesses, and the methods of legal research.

225 **Advanced Criminal Evidence** (3)

Study of procedural rules affecting the collection and use of physical e dence, with emphasis on court opinions defining the rules of search a seizure and admissibility of evidence. Prerequisite: ForS 224 or equi lent experience.

*227 **Advanced Criminal Procedure** (3)

Decision to arrest, prosecutive discretion, bail, the preliminary hearin

* May also be taken through the National Law Center, with permission of the Dean of the N tional Law Center and of the instructor.

right to a speedy trial, discovery, plea bargaining, publicity, post-conviction procedures. Prerequisite: ForS 224 or equivalent experience.

*228 **Administration of Criminal Justice** (3)

Consideration and analysis of selected advanced problems in the administration of criminal justice. Emphasis on the role and professional responsibilities of prosecutor and defense counsel and on developmental trends in the law. Prerequisite: ForS 224 or equivalent experience.

*229 **The Police and the Community** (3)

Problems and potential of contemporary urban law enforcement: the role and perspective of the police officer.

*231 **Law and Criminology I: Search for the Causes of Criminal Behavior** (3)

Role which knowledge of crime causation may play in assessing devices to control deviant behavior: factors related to criminal behavior; current causal theories.

*232 **Law and Criminology II: Society's Responses to the Criminal Offender** (3)

Study of punitive, mechanical, and correctional approaches to offenders. Emphasis on changing responses to criminal and delinquent behavior, and research on effectiveness.

241 **Food and Drug Law** (3)

The Federal Food, Drug, and Cosmetic Act, and related laws. Consumer, government, and industry viewpoints.

254 **Seminar: Selected Topics in the Forensic Sciences** (3)

Exploration of selected current issues in research, investigation, and law.

260 **Introduction to Human Physiology and Pathology** (3)

Introduction to physiology and pathology of the human body; emphasis on medical terminology. Basic understanding of the body functions in health and disease.

261 **Introduction to Forensic Pathology** (3)

Terminology and scientific techniques used in medicolegal investigations: sudden or unexpected deaths, homicides, suicides, accidental deaths, and trauma.

262 **Current Trends in Forensic Pathology and Forensic Odontology** (3)

Emphasis on (1) the relationship among law, medicine, and law enforcement; and (2) the advancement of forensic knowledge.

263 **Seminar: Law, Medicine, and Forensic Sciences** (3)

Emphasis on the introduction of forensic science data/evidence in civil and criminal cases.

264 **Medical Jurisprudence** (3)

Legal problems inherent in the practice of medicine. Laws regulating health personnel and health industry. Emphasis on professional liability.

Also be taken through the National Law Center, with permission of the Dean of the National Law Center and of the instructor.

266 **Forensic Neuropathology** (3)

Fundamentals of neuropathology of natural disease and traumatic injur of the nervous system, including demonstrations of gross patholo specimens.

267 **Applications of Histochemistry to the Forensic Sciences** (3)

Chemical and physical methods for the localization, identification, a characterization of materials under the microscope, including carboh drates, enzymes, lipids, minerals, pigments, and proteins.

268 **Photography in the Forensic Sciences** (3)

Basic use of forensic photography, including selection and use of equ ment, photographs as evidence, close-up work, and common misconc tions. Laboratory fee, $25.

269 **Principles of Forensic Toxicology** (3)

Analytical procedures used for the detection of drugs, poisons, and to agents in biological specimens. Admission by permission of instructor.

271 **Forensic Serology** (3)

Advanced techniques in forensic serology and enzymology are present Emphasis is placed on practical laboratory examinations and classifi tions of dried blood stains. Among these systems presented are Al and subgroups, MN, rhesus, and phosphoglocumutase erythrocyte a phosphatase, and adenylate kinase isoenzymes. Prerequisite: ForS 2 or permission of instructor. Laboratory fee, $25.

281–82 **Advanced Instrumental Analysis** (3–3)

Lectures and laboratory exercises in the uses of instrumentation, incl ing emission spectrograph, visible spectrophotometer, infrared spect photometer, gas chromatograph, thin layer chromotography, atomic sorption, x-ray diffraction spectrometer, mass spectrograph, neutron a vation analysis, and the electron scanning microscope.

295 **Research** (arr.)

Open to qualified Master's degree students. Research on problems proved by the Chairman of the Department or academic adviser, un the supervision of an appropriate staff member.

299–300 **Thesis Research** (3–3)

French*

Chairman: J.F. Burks, Professor of French; Monroe 429, Telephone 676-6330

Placement Examination: A student who has not been granted advanced stand and who wishes to continue in college the language begun in high school must t a placement examination before registration. Upon completion of the examinat assignment is made to the appropriate course.

1–2 **First-year French** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on cond

* Administered by the Department of Romance Languages and Literatures.

tion of Fren 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern French prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year French** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Fren 4. Conversation, grammar, composition, reading in modern French prose, introduction to French civilization. Aural training, oral practice in language laboratory. Prerequisite: Fren 1–2, or two years of high school French. Laboratory fee, $17.50 a semester.

odesy*

Adviser: Hyman Orlin, Professorial Lecturer in Geodesy, Cartography, and ography, Telephone 676-6185 or 946-3557

12 **Plane Surveying** (3)

Basic plane surveying.

13 **Geodetic Surveying** (3)

Elements of geodetic and hydrographic surveying. Prerequisite: Geod 12.

17 **Elementary Photogrammetry** (3)

Fundamentals of aerial photography, photogrammetric optics, and photographic processes. Recommended prerequisites: Cart 2, Geod 12.

18 **Intermediate Photogrammetry** (3)

Basic theory and practices. Prerequisite: Geod 17.

110 **Map Projections** (3)

Theory of projections in cartography and geodesy. Prerequisite: Math 32.

117 **Advanced Photogrammetry** (3)

Analytic photogrammetry. Prerequisites: Geod 18, Math 32.

155 **Elementary Geodesy** (3)

Principles and formulas basic to theoretical and applied geodesy. Prerequisites: Geod 13, Math 32; or permission of instructor.

156 **Geodetic Astronomy** (3)

Astronomic determination of longitude, time, azimuth, and latitude. Prerequisite: Math 32.

160 **Adjustment Computations I** (3)

(Formerly Mathematics of Adjustments and Least Squares)

Basic adjustment theory. Prerequisites: Geod 155, Math 32.

161 **Adjustment Computations II** (3)

(Formerly Adjustments in Geodesy and Photogrammetry)

Topics in advanced adjustment theory. Applications to geodesy and photogrammetry. Prerequisite: Geod 160.

with the Department of Geography and Regional Science.

Geography and Regional Science

Chairman: Marvin Gordon, Professor of Geography and Regional Science; I-200
Telephone 676-6185

51 **Introduction to Geography** (3)
General survey of the systematic fields of human geography which play a role in the analysis and interpretation of man-environment relationship in both spatial and ecological contexts.

52 **Introduction to Economic Geography** (3)
Examination of the basic principles which determine the location of eco nomic activities on the surface of the earth.

127 **Population and Settlement** (3)
Patterns of world population; factors contributing to population pressures growth, and migrations.

132 **Resource Management and Conservation** (3)
Principles and practices in effective utilization of resources in the Unite States and selected areas; public policies relating to conservation; environ mental systems, perception, and impact studies.

133 **Geography of Poverty and Hunger** (3)
Consideration of the locational aspects and correlates of poverty and hun ger; rural and urban poverty regions; regional food budgets and taboos programs concerned with the elimination of poverty and hunger.

141 **Urban Settlement** (3)
Distribution of urbanization on the surface of the earth; processes which lead to urbanization; theories which can be used to analyze the locatio of cities.

145 **Cultural Geography** (3)
Analysis of the relationships between culture and environment; emphasis on spatial and ecological considerations.

146 **Political Geography** (3)
Analysis of the interrelationships between the political community and the human and physical environment.

148 **Principles of Geography** (3)
Study of geographic principles, technology and tools designed to meet spe cific needs of teachers. Emphasis on the practical application of geo graphic concepts and the use of source materials in the classroom.

155 **Africa** (3)
Survey of the cultural and physical regional patterns of Africa.

161 **Latin America** (3)
Examination of spatial characteristics of physical and cultural phenomen in Middle and South America.

164 **Geography of China** (3)
Survey of the cultural and physical regional patterns of China.

208 **New Perspectives in Geography** (3)
An overview of recent trends in geographic research. Selected topics i

clude diffusion processes, spatial behavior, locational analysis, and environmental perception.

224 **Seminar: Political Geography** (3)

Examination of the political factor in location theory and analysis of the nature of political territories.

243 **Seminar: Urban Geography** (3)

Functional processes affecting the evolving morphology and internal spatial patterns of urban phenomena; emphasis on economic factors, behavioral considerations, and impact of time.

eology

airman: Geza Teleki, Professor of Geology; Bell 3, Telephone 676-6190

1–2 **Introductory Geology for Nonscience Majors** (3–3) (Campus Course)

Lecture (2 hours), laboratory (2 hours), optional field trips. Survey covering the principles of geology; emphasis on man's effect on the environment. Laboratory fee, $15 a semester.

3 **Introductory Geology for Nonscience Majors** (3)

Nonlaboratory course for off-campus students only. Survey covering the principles of geology.

4 **Introductory Geology for Nonscience Majors** (3)

Geological periods, evolution of life on earth. Nonlaboratory course for off-campus students only. Prerequisite: Geol 1 or 3, or permission of instructor.

5 **Environmental Geology** (3) (Campus Course)

The relation of man and society to natural environment; population evolution and mineral resources; economic, legal, and political aspects. Laboratory fee, $15.

125 **Marine Geology** (3) (Campus Course)

Lecture and map work. Principles of oceanography and submarine geology; topography, crustal structure, sedimentary processes, and marine environment. Prerequisite: Geol 1–2 or 21–22; or permission of instructor.

141 **Introductory Geochemistry** (3) (Campus Course)

Lecture (2 hours), laboratory as arranged. Principles and theories on the abundance, relationships, and distribution of the elements in various rock and mineral species. Prerequisite or concurrent registration: Geol 117 or equivalent; Chem 11–12; Math 30; Phys 1 or 3; or permission of instructor. Laboratory fee, $15.

manic Languages and Literatures

man: Carl Steiner, Associate Professor of German; Rice 404, Telephone 676-

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

1–2 **First-year German** (3–3) (Campus Course)

Fundamental concepts of German culture; essentials of German structure and basic vocabulary; reading of easy prose and conversation. Aural-oral practice in language laboratory. Prerequisite to Germ 2: Germ 1. Laboratory fee, $17.50 a semester.

3–4 **Second-year German** (3–3) (Campus Course)

Introduction to German civilization, selections from modern German prose, continuation and review of German structure, conversation, and simple composition. Aural-oral practice in language laboratory. Prerequisite to Germ 3: Germ 1–2 or equivalent. Prerequisite to Germ 4: Germ 3. Laboratory fee, $17.50 a semester.

Health Care Administration

Chairman: Leon Gintzig, Professor of Hospital Administration; Binney 21, Telephone 676-6220

153 **Survey of Health Care Organization** (3)
(Formerly Survey of Health Care Organization and Procedures)

Introduction to the organization and delivery of health care services in the United States. Emphasis on the structural features of and the resources available to the health care system.

154 **Introduction to Hospital Management and Procedures** (3)

Introduction to the structure and management of contemporary American hospitals; emphasis on the organization of hospital departments and on the functions of the department manager.

202 **Introduction to Health Care** (3)

Lecture and discussion (2 hours), laboratory (2 hours). Survey of organization, functions, trends, and issues among governmental, nongovernmental, voluntary sectors; survey of major diseases by organ systems and their impact on administration and planning; medical terminology.

203 **Health Care Organization and Management** (3)

Lecture and discussion (2 hours), laboratory (2 hours). History and current character of institutional health care. Organizational functions and structure of various kinds of health care facilities. Prerequisite or concurrent registration: Mgt 201.

205 **Hospital Management Procedures** (3)

Lecture and discussion (2 hours), laboratory (2 hours). Departmental administration. Survey of hospital law; hospital forms, procedures, and systems; and hospital programs pertaining to disaster relief, safety, fire prevention.

Hebrew*

Chairman: J.E. Ziolkowski, Associate Professor of Classics; T-23, Telephone 676-6125

Placement Examination: A student who has not been granted advanced standing ld who wishes to continue in college the language begun in high school must take placement examination before registration. Upon completion of the examination, signment is made to the appropriate course.

21–22 **Beginning Hebrew** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Clas 22. Elementary Hebrew grammar, readings from the Old Testament and contemporary literature, composition and conversation.

23–24 **Intermediate Hebrew** (3–3) (Campus Course)

Review of grammar; continued development of reading comprehension, composition, and conversation.

istory

irman: R.B. Thompson, Professor of History; Stuart 416, Telephone 676-6230

epartmental Prerequisite: Students are expected to bring to second-group courses appropriate level of background preparation. Ordinarily, this is achieved by cessful completition of first-group courses in the same area or by presenting dence of equivalent preparation. Students lacking such preparation may take ond-group courses only with the consent of the instructor. Students may waive one re of the prerequisite courses by passing a departmental waiver examination, by ining scores of 600 or above on the College Entrance Examination Board Achieve- tests, or by good performance on Advanced Placement Examinations.

39–40 **European Civilization in Its World Context** (3–3)

Hist 39: political, social, economic, and cultural history to early modern era. Hist 40: from early modern era to present.

71–72 **Introduction to American History** (3–3)

Hist 71: political, social, economic, and cultural forces of the United States in their world setting from 1620 to 1876. Hist 72: from 1876 to present.

131 **History of Germany** (3)

Political, social, and cultural development from Reformation to unification.

138 **History of World Communism** (3)

The international communist movement from its beginning to the present.

145 **Imperial Russia** (3)

(Formerly, History of Russia: 18th and 19th Centuries)

From the reign of Peter the Great to the Russian Revolution.

*ntered by the Department of Classics.

146 **Soviet Russia** (3)
(Formerly, History of Russia: Soviet Russia)
Revolution and Soviet rule to the present.

149–50 **European Diplomatic History** (3–3)
Emphasis on policies and actions of the great powers and their statesm
Hist 149: 1812 to 1890. Hist 150: since 1890. Students who receive cre
for Hist 150 cannot receive credit for Hist 157 *20th-century Europe*
Diplomatic History.

163–64 **History of Latin America** (3–3)
Political, socioeconomic, and cultural development. Hist 163: colonia
period. Hist 164: national period.

181–82 **U.S. Diplomatic History** (3–3)
Survey of American foreign relations from the era of the American Rev
lution. Hist 181: to 1898. Hist 182: 20th century.

183 **Oversea Expansion of the United States** (3)
Political, economic, social, and cultural life of our outlying possession

195–96 **History of East Asia** (3–3)
Civilizations of China and Japan; emphasis on institutional developme
Hist 195: beginnings to about 1800. Hist 196: from eve of the moder
era to present.

201 **History and Historians** (3)
Students who receive credit for Hist 201 cannot receive credit for Hi
199 *Proseminar: Readings for the History Major*.

Human Kinetics and Leisure Studies

Chairman: J.L. Breen, Professor of Human Kinetics and Leisure Studies; K–20. Tel
phone 676-6280

101 **Physical Education in the Elementary School** (3)
For elementary education and human kinetics and leisure studies majo
Child growth and development related to school and playground progra
in movement. Philosophy, curriculum, techniques of teaching, and equi
ment evaluation.

119 **Creative Dance for Children** (3)
Dance as an expressive art medium for children; emphasis on concept
and principles, methods and materials. Consideration given to dance
for children with special education problems.

158 **Safety Education** (3)
Liability, prevention, and emergency care of all types of injuries with re
erence to first aid and athletics. Proper use of personnel, facilities, and
equipment.

184 **Workshop in Human Kinetics and Leisure Studies** (1 to 3)
Workshops in human kinetics and leisure studies, dance, and recreation
Current problems, practices, and new approaches. Content of each work

shop will depend on current needs. May be repeated for credit with permission of adviser.

202 **Conceptual Basis of Motor Learning** (3)

Variables of perceptual motor learning and performance; theories, concepts, and models of learning related to the development of motor skills.

250 **Administration of Leisure and Tourism Services** (3)
(Formerly Administration of Urban Leisure Services)

Planning and organization of a comprehensive system of urban leisure services utilizing educational, cultural, and recreational resources; emphasis on public relations, personnel administration and supervision, systems analysis, fiscal management and managerial accountability.

260 **Tourism Development** (3)

Socioeconomic analysis of demand for travel and tourism resources, techniques for planning and design; examination of current trends.

280 **Advanced Workshop** (1 to 3)

Workshops in human kinetics and leisure studies, dance, and recreation. Emphasis on contemporary issues and problems; development of advanced professional competencies. May be repeated for credit with permission of adviser.

talian*

Chairman: J.F. Burks, Professor of French; Monroe 429, Telephone 676-6330

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

1–2 **First-year Italian** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Ital 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Italian prose. Aural training, oral practice in language laboratory. **Laboratory fee, $17.50 a semester.**

3–4 **Second-year Italian** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Ital 4. Conversation, grammar, composition, reading of modern Italian prose, introduction to Italian civilization. Aural training, oral practice in language laboratory. Prerequisite: Ital 1–2 or two years of high school Italian. **Laboratory fee, $17.50 a semester.**

*Administered by the Department of Romance Languages and Literatures.

Journalism

Chairman: Philip Robbins, Associate Professor of Journalism; Stuart 300A, Tele phone 676–6225

116 **Magazine Layout and Design** (3)

Layout, typography, and design for magazines, newsletters, house organs and similar publications for associations, institutions, and industry.

145 **Principles and Problems of Public Relations** (3)

Principles, problems, and ethics of public relations for government agencies, commercial establishments, educational and other public institutions. Case histories of successful programs.

Latin American Civilization—Special Program

Program Director: R.C. Burns; Building LL, Telephone 676-7049
Faculty Consultants: Marvin Gordon, Professor of Geography and Regional Science; R.L. Humphrey, Jr., Associate Professor of Anthropology; P.F. Klarén, Associate Professor of History; J.W. Robb, Professor of Romance Languages; B.M. Sapir, Professor of International Affairs and Political Science.

101 **Latin American Civilization** (3)

A three-week, University-conducted study program in a selected area of Latin America, effecting a broad synthesis of history, politics, economics, geography, language, and literature in order to achieve an understanding of contemporary problems and assess national attitudes in the light of world relations. On-the-spot seminars, guest lectures at universities, instructional visits to government offices, first-hand observation of each country and the operation of its economy, comparisons and contrasts among the countries of the area. May be repeated for credit.

Management Science

Chairman: J.F. McCarthy, Jr., Associate Professor of Behavioral Sciences; Government 201, Telephone 676-7375

118 **Introduction to Information Processing** (3)

Basic principles, terminology, and methods of computer data processing. Introduction to the use of the computer as a tool through homework assignments illustrating typical problems encountered in business and government data processing. Assignments involve flow charting and computer programming in a higher level language (FORTRAN) and are run on the University's computer and on the School's computer terminals. Laboratory fee, $25 (applicable to off-campus locations having access to the University Computer Center).

119 **Computer Programming for Information Systems** (3)

COBOL programming for business and government data processing appli-

cations. For students already familiar with basic computer concepts, flow charting, and programming. Emphasis on practical computer applications in accounting and management information systems. Prerequisite: Mgt 118 or Stat 97. Laboratory fee, $25 (applicable to off-campus locations having access to the University Computer Center).

120 **Information Systems Development I** (3)

Assessment of the systems concept and its relationship to organizational information decision-making and management. Concepts and techniques involved in the initial development of new or revised computer-based information systems, e.g., systems analysis and design phases. Prerequisite: Mgt 118, 119; or permission of instructor.

121 **Information Systems Development II** (3)

A further examination of the information systems development process, including concepts and techniques for assessment, selection, introduction, operation, and maintenance of a newly designed automated information system. Prerequisite: Mgt 120 or permission of instructor.

201 **Advanced Administrative Management** (3)

Overview of organization and management concepts and theory applicable to all types of administrative units. Analysis of evolution of management functions and practices in various organizational contexts. Assessments, from a systems viewpoint, of ethical and moral issues confronting the modern manager, in the context of contemporary sociotechnical environment dynamics.

203 **Mathematics for Management** (3)

Mathematical concepts employed in the solution of management problems. Applications of analytical geometry, functions, elements of calculus, and linear algebra to optimization problems. Prerequisite: algebra.

204 **Quantitative Factors in Administration** (3)

Survey of quantitative techniques used in the solution of management problems. Potentials and limitations of mathematical models and proper areas for their application. Topics include probability, statistical decision theory, linear programming, waiting line, inventory replacement models.

207 **Human Behavior in Organizations** (3)

Individual, group, intergroup, and other human behavior and development; application of social science research to administration. Learning exercises and practical applications emphasized.

208 **Current Issues in Organizational Behavior** (3) (Campus Course)

Study of behavioral factors relating to issues such as automation, ethics, interpersonal relations, organizational change, and similar problems. Problems in behavioral science research. Prerequisite: Mgt 207.

210 **Behavioral Factors in the Process of Change** (3) (Campus Course)

Review of research, theory, and practice related to the process of change. Basic principles of planned change; individual, group, organization, community and cultural change. Emphasis on the relationship between human behavior research and theory and the change process. Prerequisite: Mgt 207 or permission of instructor.

212 **Organizational Development: Concepts and Methods** (3) (Campus Course)

Primarily for doctoral students. Examination of different concepts of or-

ganizational structure, processes, and growth. Models of organizational change will be developed with a taxonomy of methods of initiating action to further organizational development. The methods of action, research, team building, confrontation methods, objectives analysis, survey research, and structural revision will be related to organizational development processes. Prerequisite: Mgt 210 or equivalent.

213 **Consultative Processes in Organizations** (3) (Campus Course)

Primarily for doctoral students. Examination through actual practice as well as theory of the nature of the helping process between one person or group and another person or group. Dynamics of the consulting process will be explored as well as role differences in internal and external consultation. Development of skill in the helping relationship will be furthered within the framework of interpersonal relation concepts and laboratory experiences. Prerequisite: Mgt 210 or equivalent.

225 **Managerial Statistics I** (3)

The mathematics of probability and statistics and its applications in management science and operations research. Topics include random variables; discrete and continuous probability distributions; moments and other descriptive measures; sampling theory; and an introduction to statistical estimation, hypothesis testing, and regression analysis. Prerequisite: Mgt 203 or equivalent.

226 **Managerial Statistics II** (3)

Management applications of the theory and techniques of mathematical statistics. Topics include maximum likelihood and other methods of estimation, hypothesis testing, descriptive measures of bivariate distributions, regression and correlation, analysis of time series, econometric models and multiple regression, statistical decision theory, and the revision of probabilities in decision-making. Prerequisite: Mgt 225.

227 **Mathematical Programming: Techniques and Applications** (3)

Technical and management considerations of linear and nonlinear programming. Mathematical and computational aspects of linear programming. Formulation of linear programming models. Studies of applications of linear programming. Introduction to theory and application of nonlinear programming. Prerequisite: Mgt 203 or equivalent.

228 **Techniques of Operations Research** (3)

Survey and introduction to contemporary operations research techniques. Analytical methods such as simulation, queuing, inventory models, dynamic programming, integer programming, and network flows. Prerequisite: Mgt 225, 227.

229 **Seminar: Management Science and Operations Research** (3)

Supervised study in depth and advanced projects in management science and operations research. Prerequisite: Mgt 226, 227; or permission of instructor.

240 **Survey of Information Technology** (3)

A management-oriented presentation of the vocabulary, concepts, and trends in computer hardware and software, information systems design and development, organizational impact, and effective management: milestones of past and current research; computer technology as a rapidly evolving force of major significance in business, government, and industry. Designed for students without prior information technology experience.

and who do not plan to take additional information technology courses. Laboratory fee, $25 (applicable to off-campus locations having access to the University Computer Center).

241 **Management Information Systems Development and Application** (3)

Contemporary theories and practices in the development of management information systems. Participation in the design of information systems specifications. The roles of both management and systems design personnel in the systems development process studied and evaluated. Impact of management information systems upon the organization and its decision-making processes evaluated. Case studies. Prerequisite: an introductory course in information technology, or permission of instructor.

242 **Comparative Computer Systems** (3)

Characteristics and capacities of the range of information processing equipment in use today. Recent and prospective equipment and software development. Selection of computers and related software and equipment. Prerequisite: Mgt 241 or permission of instructor.

243 **Management of Information Technology** (3)

Advanced course; emphasis on principles, practices, and trends in the management of information technology. Topics include the role and control of an information processing installation; trends, new hardware, and advanced technology in the computing milieu and their implications for information processing management; and analysis of the performance of information processing activity internally and externally, according to developed criteria. Case studies. Prerequisite: Mgt 241, 242; or permission of instructor.

244 **Information Systems and Telecommunication** (3)

Study of the growing linkages among the technology of information processing, information transmission, and organization management—computers, communications, and managers—from two points of view: (1) potentials for improved management, and (2) solving communications-related problems of informations systems design, implementation, and operation. Admission by permission of instructor.

245 **Data Base Management** (3)

An in-depth approach to the understanding and use of the latest techniques for developing and implementing an effective data base system. Topics include data base organization, creation, and maintenance; effort and economic justification; evaluation criteria; standardization of data base systems; impact of packaged data management systems; and an analysis of the current state-of-the-art in data base development. Prerequisite: Mgt 119, 241. Laboratory fee, $25, (applicable to off-campus locations having access to the University Computer Center).

249 **Seminar: Information Technology** (3)

Current problems in the design and implementation of computer-supported systems; emphasis on current state-of-the-art through discussion with leading experts in the field, analysis of literature. Prerequisite: Mgt 241, 242, 243; or permission of instructor.

260 **Introduction to General Systems and Cybernetics** (3)

For graduate students only. Analysis of fundamental general systems concepts and cybernetic theory evolving in various branches of knowledge and academic disciplines; emphasizes their transcontextual and interdiscip-

linary nature. Systems approach and general systems frame of reference compared and contrasted. Topics include living systems and cross-level hypotheses; pervasiveness of nature's entropic thrust; taxonomies of systems, feedback loops in open systems, and homomorphic and isomorphic relationships as conceptual tools. Cybernetic systems, such as homeostatic, heterodynamic, and morphogenic; metalanguages and metasystems; ultrastability and equifinality; essential requirements of a viable system.

261 **Fundamentals of General Management Systems and Organizational Cybernetics (3) (Campus Course)**
(Formerly Mgt 224 Theory and Management of Systems)
Differentiation of systems management and general management systems approaches. Essential dynamics of organization and management from a GEMSOC standpoint. Organization structure and management process as systemic interfaces. Idealized organizational cybernetics, including on-line, real-time, and closed-loop systems. Decision-making and problem-solving as management focii; means-ends chains and bounded rationality. Organizational objectives and human values from a general systems standpoint. Prerequisite: Mgt 201, 207, 260, or equivalent. Mgt 204 is a recommended, not required, prerequisite.

*280–81

–82 **Managerial Aspects of National Security** (3 or 4–3 or 4–3)
The application of business management principles to the military aspects of national security; organization and administration of the federal government for national defense; management of national resources (natural, human, energy, economic); budgeting and controllership; determination of requirements; procurement; production; supply management; and communications.

295 **Research Methods (3)**
Research techniques, sources of information, array and analysis of data, interpretation and presentation of the findings.

Mathematics

Chairman: D.N. Nelson, Professor of Mathematics; Library 719J, Telephone 676-6235

No Mathematics courses numbered 1 to 100 are available for college credit if the student's previous training in mathematics meets the prerequisite for a higher numbered course.

Graduate credit may not be given for Mathematics courses numbered from 101 to 200 without the permission of the Chairman of the Department.

3 **College Algebra (3)**
Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry.

* Available only to students in the Master of Science in Administration program at the Industrial College of the Armed Forces.

6 Plane Trigonometry (3)

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor).

9 General Mathematics I (3)

For students electing Math 9 and 10 at a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics.

10 General Mathematics II (3)

Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9.

30 Precalculus (3)

Set theory, inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students must take a placement examination in algebra and trigonometry.

31 Calculus of One Variable (3)

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent. Math 30 may be waived as a prerequisite by examination on scheduled dates.

32 Calculus of Several Variables (3)

Vectors, determinants, partial derivatives, multiple integrals, and infinite series. Prerequisite: Math 31.

33 Calculus of Vector Functions (3)

Curves, differential equations, infinite series, vector calculus, line integrals, Green and Stokes theorems. Prerequisite: Math 32.

***51 Mathematics for the Social and Management Sciences I (3)**

Notion of function, graph of function, and sequences; differential calculus of functions of one variable; exponential and logarithmic functions. New students must take a placement examination in algebra prior to registration.

***52 Mathematics for the Social and Management Sciences II (3)**

Integral calculus of functions of one variable; functions of several variables; partial derivatives, maxima and minima, Lagrange multipliers; systems of linear equations and inequalities; matrix algebra, determinants, rudiments of linear programming. Prerequisite: Math 51.

11 Mathematics for Engineers and Physicists I (3)

Linear differential equations, linear algebra, Fourier series and integral, nonlinear differential equations of the first order. Prerequisite: Math 32.

12 Mathematics for Engineers and Physicists II (3)

Ordinary differential equations, systems of differential equations, boundary-value problems, partial differential equations. Prerequisite: Math 111.

management science students with a strong record in high school mathematics are take Math 31, 32, and 124 instead of Math 51 and 52.

124 **Introduction to Matrix Theory** (3)

Operations on matrices, linear equations, matrix inversion, vector spaces, characteristic roots and vectors, Hamilton-Cayley Theorem. Systems of linear difference and differential equations. Quadratic forms. Prerequisite: Math 32 or permission of instructor.

134 **Introduction to Boundary-value Problems** (3)

Prerequisite: Math 111 or 142.

139 **Advanced Calculus I** (3)

Review and extension of elementary one-variable calculus, emphasis on the theoretical foundations; differential calculus of several variables. Prerequisite: Math 33.

140 **Advanced Calculus II** (3)

Differential and integral calculus of several variables: contraction maps, implicit function and differential equation theorems. Prerequisite: Math 139 or equivalent.

153 **Introduction to Numerical Analysis** (3)

Introduction to fundamentals of numerical analysis using modern digital computers. Solution of linear systems and of ordinary differential equations. Interpolation polynomials. Iterative solution of nonlinear equations. Simple quadrature techniques. Prerequisite: Math 111 or 139, or equivalent.

Music

Chairman: George Steiner, Professor of Music; FF–10, Telephone 676-6245

3 **Introduction to Musical Understanding** (3)

Introductory history of musical styles, related to listening; elements and materials of music.

4 **Survey of Music Literature** (3)

Introductory study of musical forms, structures, and textures; aural analysis of selected literature.

Oceanography*

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodesy, Cartography, and Oceanography, Telephone 676-6185 or 946-3557

11 **Navigation** (3)

Theory of navigation, charts, navigation aids, celestial navigation, shipboard instruments.

* Affiliated with the Department of Geography and Regional Science.

101 **Oceanography I** (3)
(Formerly Ocea 101–2 Elementary Oceanography [3–3])
Chemical and physical properties of the oceans.

102 **Oceanography II** (3)
(Formerly Ocea 101–2 Elementary Oceanography [3–3])
Physiography and characteristics of the sea floor, ocean basins and margins. Marine biology and ecology.

105 **Elementary Geophysics** (3)
Gravity, geomagnetism, and seismology in cartography, geodesy, and oceanography.

110 **Physical Oceanography** (3)
Physical properties of sea water, underwater sound, and propagation of light. Currents, heat budget, turbulence, and the general circulation and water masses of oceans. Prerequisites: Math 32, Ocea 101.

111 **Ocean Waves and Tides** (3)
Survey of tidal theory and analysis. Prerequisites: Math 32, Ocea 101.

112 **Biological Oceanography** (3)
The study of life in the sea. Prerequisite: Ocea 102.

113 **Marine Geophysics** (3)
Principles of marine geophysical measurements and interpretation. Prerequisites: Ocea 105, Phys 1.

114 **Chemical Oceanography** (3)
Chemical processes in the marine environment, including composition of sea water, nutrients, natural composition and variation, carbonate cycle, and extraction. Prerequisites: Chem 12, Ocea 101.

115 **Geological Oceanography** (3)
Physiography of the sea floor and processes active in ocean basins and margins. Prerequisite: Ocea 102.

120 **Coastal Ecology** (3)
Coastal ecosystems and how they function; the impact of man's activities. Impact of specific topical activities.

122 **The United States and the Oceans** (3)
Tracing the nation's involvements in marine affairs; the effect upon domestic policy regarding alternative ocean uses.

124 **Introduction to the Law of the Sea** (3)
The changing role of the oceans in international relations.

macology

an: H.G. Mandel, Professor of Pharmacology; Ross Hall, Telephone 331-6541

115 **Drug Abuse Education** (3)
Psychological and sociological bases of drug abuse, pharmacological and

toxicological aspects of drug action on both the brain and peripheral organ systems, legal and societal implications of and reactions to drug abuse. Lectures and discussions on alcohol, narcotics, central nervous system stimulants and depressants, marijuana and other hallucinogenic and psychedelic drugs.

215 **Adolescent Drug Abuse** (3 or 4)

Primarily for teachers, counselors, and administrators. Multidisciplinary lectures and discussions concerning the physiological and psychological effects of narcotics, central nervous system stimulants and depressants, alcohol, and hallucinogenic and psychedelic drugs; psychosocial factors leading to adolescent drug abuse; legal implications of drug abuse; prevention, control, and treatment of drug abuse.

Philosophy

Chairman: Thelma Z. Lavine, Elton Professor of Philosophy; Rice 611, Telephone 676-6266

50 **Introduction to Philosophy** (3)

Readings from major philosophers and study of philosophic positions from Plato to the present.

131 **Ethics** (3)

Theories of "the good" and "the right" from Plato to Sartre.

162 **Aesthetics** (3)

Nature of aesthetic experience, problems of appreciation and criticism in the arts, and theories of artistic creation. Emphasis on contemporary art and criticism.

172 **American Philosophy** (3)

Philosophies of Peirce, Royce, James, Dewey, and Santayana as representatives of American thought.

193 **Contemporary Philosophy: Phenomenological** (3)

The phenomenological movement, including its development into German and French existentialism, and its more recent phases.

Physics

Chairman: H.H. Hobbs, Professor of Physics; Corcoran 102. Telephone 676-6215

ASTRONOMY

9–10 **Introduction to Astronomy** (3–3) (Campus Course)

Lecture (2 hours), recitation (1 hour), laboratory (2 hours). Classical through modern astronomy with introduction to basic principles underlying astronomical systems and observations. Primarily for nonscience majors. Laboratory fee, $11 a semester.

PHYSICS

1 **Foundations of Physics** (4) (Campus Course)
(Formerly General Physics)
Topics in classical physics which form a foundation for modern physics. Prerequisite: two years of college preparatory mathematics or concurrent registration for Math 6. Laboratory fee, $11.

2 **Introduction to Modern Physics** (4) (Campus Course)
Selected topics in modern physics, including relativity and quantum theory. Prerequisite: Phys 1 or equivalent. Laboratory fee, $11.

*3 **Foundations of Physics** (3)
(Formerly General Physics)
Same as Phys 1 without laboratory.

†4 **Introduction to Modern Physics** (3)
Same as Phys 2 without laboratory.

Political Science

Chairman: H.L. LeBlanc, Professor of Political Science and Public Affairs; C–619, Telephone 676-6290

Departmental prerequisite: PSc 4 and 6 or 5 and 6 are prerequisite to courses in Political Science numbered from 101 to 200. Courses numbered from 201 to 300 are for graduate students who have the appropriate undergraduate course prerequisite.

4 **Introduction to Political Science** (3) (Campus Course)
The study of political behavior, including the role of politics in today's world, the sources of elite and mass political behavior, and the influence and nature of political institutions. Students who receive credit for PSc 4 cannot receive credit for PSc 5.

5 **Introduction to Political Science** (3)
Introduction to the study of comparative political systems; emphasis on structures and processes of major foreign governments and the force of basic ideologies. Students who receive credit for PSc 5 cannot receive credit for PSc 4.

6 **Introduction to Political Science** (3)
Introduction to the study of the structure, powers, and processes of the American political system.

103 **State Politics** (3)
Theory and practice of American federalism, factors influencing state policy choices, state responsiveness to urban problems.

---

*This course may not be taken by students who have completed, or are enrolled in, or plan to take Phys 1.
†This course may not be taken by students who have completed, or are enrolled in, or plan to take Phys 2.

104 **Urban Politics** (3)

Demographic trends and implications, local metropolitan political system issues in urban politics, strategies of political change.

111 **Comparative Government and Politics** (3)

Government and politics of the principal constitutional democracies Western Europe.

*112 **Comparative Government and Politics** (3)

Government and politics of the communist nations; emphasis on th Soviet Union and the countries of Eastern Europe.

117–18 **Political Theory: Major Issues of Western Political Thought** (3–3)

PSc 117: foundations of Western political thought—Plato to Aquina PSc 118: philosophical roots of modern political order and disorder— Machiavelli to Rousseau.

119–20 **American Political Thought** (3–3)

Introduction to political thought in the United States from colonial time to the present.

121–22 **U.S. Constitutional Law and Politics** (3–3)

PSc 121: separation of powers, federal-state relationships, economic reg ulation. PSc 122: political and civil rights. Prerequisite: junior status.

125 **Legislative Process** (3)

Study of Congress, including theories of representation, legislative power structure, selection of legislators and the roles they play, decision-making and the relationship between the legislative and executive branches.

126 **The American Presidency** (3)

Examination of the politics of Presidential selection, the authority of the contemporary institution, the mechanisms and processes for formulating public policy, and the influence of personality on performance in office.

145 **U.S. Political Parties and Politics** (3)

Party system and structure, role of ideology, voting behavior, campaigns and elections, devices for organizing the government.

151 **Public Administration and Public Policy-making** (3)

Examination of the process by which the federal government selects and implements public policies. Particular attention to the role of bureaucracies in the policy-making process. Criteria for the evaluation of public policy.

167 **U.S. Foreign Policy** (3)

Constitutional and political factors that determine the formulation, execution, and substance of U.S. foreign policy.

171 **International Politics** (3)

International actors, international and domestic environments of foreign policy, global and regional patterns, general characteristics of foreign policy.

* PSc 112 and 115 are related in their subject matter, and credit for only one may be applied toward a degree.

172 **International Organizations** (3)
Development and operations of the United Nations, regional organizations, and functional international organizations.

181 **Public International Law and Organization** (3)
Survey of international law; emphasis on development and trends.

190 **Politics of Middle and Southern Africa** (3)
Comparative analysis of the political systems of selected countries of non-Mediterranean Africa.

191 **Governments and Politics of the Middle East** (3)
Domestic and international politics of the eastern Arab states, Turkey, Iran, and Israel.

192 **Governments and Politics of North Africa** (3)
Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan; their relations with states of the Middle East.

193 **Governments and Politics of South and Southeast Asia** (3)
Domestic and international politics of the major states in the area.

194 **Governments of China and Japan** (3)
Institutions and processes of government in contemporary China and Japan, with some historical background. Attention to ideological forces. Students who receive credit for PSc 194 cannot receive credit for PSc 162.

204 **Urban Politics** (3)
Readings and discussions on patterns and implications of urban growth, local and metropolitan political systems, policy formation and change, conflict management, political constraints on social reform.

205 **Government, Science, and Technology** (3)
Examination of the demands on national and international political systems resulting from the impact of scientific and technological developments and of the responses of governmental institutions and processes to these demands.

209 **Presidential-Congressional Relations** (3)
Examination of the patterns of interaction between the executive and legislative branches; emphasis on policy-making roles and structures.

211–12 **Comparative Government and Politics** (3–3)
Problems of comparative political analysis; a comprehensive examination of the literature in comparative politics.

215–16 **Seminar: the Communist Camp in World Politics** (3–3)
Significant issues of communism, particularly in the Soviet Union and Red China; concept and structure of "world socialist system"; intra-bloc relations with emphasis on the Sino-Soviet dispute.

220 **Congress and the Political System** (3)
Examination of the roles, structure, and function of political parties and interest groups as they relate to the legislative process.

222 **Judicial Policy-making and Civil Liberties** (3)
Examination of the role of the judiciary in policy formulation; emphasis on the U.S. Supreme Court and civil liberties issues.

223 **Defense Policy Analysis** (3)
Analysis of selected topics in U.S. defense policy.

239 **Economic Policy Analysis** (3)
Analysis of selected topics in U.S. monetary and fiscal policy.

240 **Legislative Theory and Behavior I** (3)
Selected problems of the U.S. legislative system at the national and state level. Emphasis on legislative recruitment, representative-constituency relations, policy-making and communication.

241 **Legislative Theory and Behavior II** (3)
Selected problems of legislative theory and behavior from a comparative perspective with particular reference to the parliamentary systems of West Germany, France, and Britain.

242 **Methods of Legislative Research** (3)
The process of empirical research: construction of research design, data collection, and analysis. Techniques discussed will include content analysis, survey research, and analysis of institutional voting.

244 **Public Policy Analysis** (3)
Reading and research in systematic methods of public policy analysis.

247 **Legislative Elements in Economic Policy Development** (3)
Economic analysis of selected legislative issues and the effect of various economic pressures on policy outcomes.

248 **Public Opinion and Voting Behavior** (3)
Analysis of mass political attitudes and voting behavior.

249 **Domestic Policy Analysis—Selected Topics** (3)
Analysis of U.S. policy toward selected domestic problems.

259 **Foreign Policy Analysis—Selected Topics** (3)
Analysis of U.S. foreign policy toward selected world regions.

267 **Seminar: U.S. Foreign Policy** (3)
Research and selected reading as the basis for an analysis of the foreign policy of the United States, with particular reference to the decision-making process and the execution of policy.

288 **Seminar: Soviet Military Policy and Strategy** (3)
Soviet developments in military policy and strategy with attention to intra-bloc military cooperation, political context of Soviet military policy, significant changes in recent Soviet military thought.

Psychology

Chairman: R.D. Walk, Professor of Psychology; GG-211, Telephone 676-6320

Departmental prerequisite: Psyc 1 or 5 or 6 is prerequisite to all other courses in Psychology. Six semester hours in Psychology courses are prerequisite to Psy-

ology courses numbered above 100. The departmental prerequisite may be waived ith the permission of the instructor.

1 **General Psychology** (3)

Fundamental principles underlying human behavior.

8 **Psychology of Motivation and Personality** (3)

Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, and assessment and description of personality emphasized.

22 **Introduction to Educational Psychology** (3)

The contributions of psychology to education; emphasis on learning.

29 **Psychology of Childhood** (3)

Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world.

101 **Abnormal Psychology** (3)

Causes, diagnosis, treatment, and prevention of various types of maladjustments and mental disorders. Prerequisite: 6 semester hours in psychology, or 3 in psychology and 6 in a biological science.

112 **Psychology of Adolescence** (3)

Psychological characteristics and problems peculiar to adolescence, with emphasis on applications of psychology to solution of such problems.

121 **Psychology of Learning** (3)

Theories and issues related to basic learning processes as determinants of behavior. Emphasis on current research using both human and animal subjects.

129 **Theories of Personality** (3)

Survey of personality theories; emphasis on their application to problems of individuals.

131 **Psychological Tests** (3)

Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $7.

144 **Personnel and Industrial Psychology** (3)

Psychological concepts and methods applied to problems of personnel management, human engineering, employee motivation, and productivity.

145 **Psychology of Management** (3)

Psychological aspects of managing work organizations. Departmental prerequisite waived.

46 **Psychotechnology of Learning and Training** (3)

Psychological principles, concepts, and techniques of human learning and behavioral modification as applied to the design and operation of training and development systems.

51 **Social Psychology** (3)

Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war.

156 **Psychology of Attitudes and Public Opinion** (3)
Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare.

175 **Career Development in Youth and Maturity** (3)
Emphasis on the development of long-range career objectives based on review of experiences, the results of psychological testing, seminar discussion groups, and guided independent study. Analysis and practice of the specific skills needed to negotiate for advancement or to accomplish a career change.

191 **Independent Research in Psychology** (3) (Campus Course)
Individual study and research for those desiring to graduate with honors or to pursue more specialized topics. Arrangements must be made with the Department of Psychology.

211 **Assessment of Cognitive Functioning** (3)
Concepts of intelligence and achievement and their assessment through a variety of group and individual procedures. Emphasis on evaluation of children. Material fee, $7. Admission by permission of instructor.

246 **Seminar: Personnel Measurement Techniques** (3)
Detailed consideration of techniques of personnel selection and performance evaluation. Employment tests, personal data, assessment interviews, and performance ratings.

Public Administration

Chairman: M.M. Harmon, Associate Professor of Management; Government 302. Telephone 676-6295

210 **Concepts and Issues in Public Administration** (3)
An introduction to graduate study in public administration. Professionalism and the public service. Nature of public interest: multiplicity of organizational objectives. Administrative responsibility and individual and organizational ethics. Individual goals and career planning.

213 **Administration in the Federal Government** (3)
(Formerly Administration in Government)
Critical analysis of federal administrative organizations as an integral part of the political system. Roles of Congress, the President, the courts, interest groups, political parties, and the public in the public decisional process. Special attention to centripetal and centrifugal forces.

223 **Behavioral Factors in Large Organizations** (3)
Analysis of the nature and characteristics of large organizations. Bureaucracies and their behavioral patterns: dysfunctionalism. Approaches to policy guidance and leadership, particularly in large public organizations. influence and control systems. Future trends.

231 **Public Personnel Administration** (3)
Survey of basic principles and functions of personnel administration in the

public service. Roles of personnel management, recruitment, placement, wage and salary administration, training, retirement, and other personnel functions.

232 **Problems in Public Personnel Management** (3)
Analysis and evaluation of major personnel management problems in government; employee-management relations; interagency and intergovernmental relationships. Impact of automation. Evaluation of personnel systems.

233 **Seminar: Manpower Development and Utilization** (3)
Examination of public and private manpower trends, problems, policies, and programs. Exploration of approaches, old and new, to manpower development and utilization. Analysis of impact of economic, political, and social factors on manpower. Students will select a specific area for individual investigation.

235 **Technological Change and Manpower** (3)
Research, discussion, and readings dealing with manpower problems arising from automation and other technological changes. Evaluation of these developments in government and business; their implications for productivity, employment, training and education, and personnel and industrial relations. Analysis of economic, political, and social factors influencing public and private manpower policies.

245 **Intergovernmental Relations** (3)
(Formerly Managing the Changing Federalism)
Assessment of the impacts and consequences of changes in the administration of inter-governmental policies and programs in the federal system. Legislation, roles, and responsibilities of federal, state, regional, and local systems will be examined from both theoretical and practical vantage points to understand their effects.

248 **Financing Local Government** (3)
(Formerly Financing Metropolitan Services)
Analysis of the structure and administration of public finance in local governments. Includes the financing of services through municipal taxation and other revenue sources, debt administration, and implications of the budgetary process.

249 **Urban Public Policy** (3)
(Formerly Administration in Metropolitan Area Governments I)
Examination of views of the city. Emphasis on urban systems in their social, political, economic, and physical aspects. Against the background of urban politics and administration, will address such central functional areas as health, education, welfare, crime, poverty, transportation, and housing.

250 **Administration of State and Local Governments** (3)
(Formerly Administration in Metropolitan Area Governments II)
Examination of state and local governmental structures and functions, public and private demands, their place within the federal system, their limitations, and alternatives available to encourage more effective administration.

51 **Governmental Budgeting** (3)
Survey of the basic concepts, principles, and practices in governmental budgeting interrelationship of planning, programming, and budgeting; their role in the management process.

252 **Public Expenditure Analysis and Planning** (3)
(Formerly Problems in Planning, Programming, and Budgeting)
Intensive analysis of managerial and economic procedures and techniques used by government agencies for planning, allocating, and managing scarce resources in the achievement of public programs. Topics discussed include benefit-cost analysis, program budgeting, systems analysis, present value analysis, and government contracting.

260 **Policy Formulation and Administration** (3)
Analysis in depth of factors and processes involved in policy development, with particular attention to selected areas of national policy; development of agency goals and objectives.

262 **Seminar: Science, Technology, and Public Policy** (3)
The impact of science and technology upon public administration in terms of both administrative practice and national policies.

295 **Research Methods** (3)
Survey of research methods; application to problems of public administration.

299 **Thesis Seminar** (3) (Campus Course)
Examination of thesis standards, research philosophy and methodology in public administration.

300 **Thesis Research** (3)

Religion

Chairman: R.G. Jones, Professor of Religion; O-102, Telephone 676-6325

9 **The Hebrew Scriptures** (3)
Historical and literary study of the Hebrew Scriptures with consideration of development of religious ideas, institutions, and outstanding personalities.

10 **The New Testament** (3)
Study of New Testament literature from the standpoint of occasion, purpose, dominant ideas, and permanent values. Emphasis on approach, structure, and significance of the Gospels and Epistles.

21 **Religion and Man's Search for Meaning** (3)
(Formerly Introduction to Religious Thought)
Traditional religious concepts, language of contemporary religion amidst modern scientific and secular intellectual tendencies, and the place of religion in today's society.

59–60 **History of Religions** (3–3)
Origins, evolution, and contemporary status in historical context. Rel 59: primitive religion and the religions of the East (Hinduism, Buddhism, Taoism, Confucianism, Shinto). Rel 60: religions of the West and Near East (ancient religions, Judaism, Christianity, Islam).

127 **Medicine, Religion, and Healing** (1) (Campus Course)
Total care concept. Importance of religion in medical practice for patient and physician. Concept of the professional man, the clergy's role in healing, religious perspective on issues in medical ethics.

216 **Supervised Clinical Pastoral Education** (I-A) (6)

Full-time program of clinical pastoral education in an approved center. Involvement in the responsibility for pastoral ministry is reviewed and evaluated in a peer-group context.

217 **Supervised Clinical Pastoral Education** (I-B) (6)

A continuation of Rel 216 with emphasis on pastoral and personal identity, sustained pastoral relationships, and pastoral methods and skills.

218 **Supervised Clinical Pastoral Education** (III-A) (6)

Responsibility in pastoral ministry is increased with emphasis on group work, interprofessional involvement, use of specific counseling methods, work with persons with special problems. Prerequisite: Rel 216 and 217; or equivalent.

219 **Supervised Clinical Pastoral Education** (III-B) (6)

Continuation of Rel 218 with emphasis on examination and review of administrative procedures, design of pastoral programs, and development of a pastoral theology.

222 **Seminar: Christian Ethics** (3) (Campus Course)

Important tendencies in ethical reflection of the contemporary Christian Church; contributions of social sciences to that reflection.

223 **Religious and Ethical Perspectives on Medical Problems** (3)

Religious and ethical questions in medical problems and medically related issues.

225 **The Dynamics of Ministering to the Young Adult** (3)

Conceptual models of development of young adults from late adolescence; special problems of educational and military experience, vocational choice, marriage and the family, and physical, intellectual, emotional, and religious development. Encounter experience with persons and groups.

227–28 **Advanced Studies in Pastoral Care** (3–3)

History and present state of methodologies and conceptual models of pastoral counseling and leadership in groups; supervised work in interfaith and multidisciplinary ministries.

235 **Seminar: Roman Catholicism in the Modern World** (3) (Campus Course)

Important leaders and their ideas in selected developments since 1500—doctrinal, spiritual, biblical, liturgical, and ecumenical.

237 **Seminar: Theological Analysis** (3) (Campus Course)

Historical and topical study of the development of important ideas in such areas as Christology, soteriology, and ecclesiology.

–300 **Thesis Research** (3–3) (Campus Course)

ic Languages and Literatures

man: G.A. Olkhovsky, Associate Professor of Russian; Library 627, Telephone 335

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

1–2 **First-year Russian** (3–3) (Campus Course)

Beginners' course in fundamentals of grammar and pronunciation. Prerequisite to Slav 2: Slav 1. Laboratory fee, $17.50 a semester.

3–4 **Second-year Russian** (3–3) (Campus Course)

Intermediate course in Russian language. Prerequisite to Slav 3: Slav 1–2 or two years of high school Russian. Prerequisite to Slav 4: Slav 3. Laboratory fee, $17.50 a semester.

9–10 **Intermediate Russian Conversation and Composition** (3–3) (Campus Course)

Listening comprehension; oral and written practice. Prerequisite: Slav 4 or 6, or permission of instructor.

91–92 **Introduction to Russian Literature** (3–3)

Emergence and development of Russian literature and ideas during the 19th and early 20th centuries—in English.

109–10 **Advanced Russian Conversation and Composition** (3–3)

Developing proficiency in oral and written expression. Prerequisite: Slav 10 or equivalent.

161–62 **Russian Culture** (3–3)

Survey of Russian cultural heritage from origins of ancient Russia to present—in English. Lecture, recitation, discussion, and individual reports on assigned topics.

165 **Soviet Literature from the Revolution to World War II** (3)

Basic themes, issues, literary figures of the Soviet 1920s. The fate of literature and writers under increasing state control; Five-year Plan literature. Lecture, discussion, reports—in English.

166 **Soviet Literature from World War II to the Present** (3)

Literature in wartime, under Stalinism, and in the "thaws." The new generation of dissident liberals and "underground" literature. Lecture, discussion, reports—in English.

193–94 **The Other Slavs: Their Literature—in English** (3–3)

An examination of non-Russian Slavic literatures from their beginnings to the present day. Emphasis on themes, ideas, and styles peculiar to each literature.

Sociology

Chairman: R.G. Brown, Professor of Sociology; D-201, Telephone 676-6345

Departmental prerequisite: Soc 1 is prerequisite to all other courses in Sociology numbered below 200.

1 Introductory Sociology (3)

General principles of sociology; development of culture and personality, impact of groups and institutions on man's social behavior. Survey of fields within sociology.

2 Uses of Sociology (3)

Introduction to the various methods by which sociologists have approached the investigation of social phenomena.

101 Development of Social Thought (3)

Examination of concepts and theories relevant to the nature of society and human relationships from ancient writings to the 20th century.

110 The Sociology of Work (3)

Introductory survey of industrial sociology; sociology of occupations and professions; industry-community relations; and analysis of large, complex organizations.

124 Medical Sociology (3)

Social factors and processes related to the etiology and treatment of physical and mental illness; medical occupations and professions, medical organizations, problems of delivery of health care services.

126 Urban Sociology (3)

Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburban development.

127 Population Problems (3)

Composition of populations, trends in population growth and population pressure, factors producing population movements, effects of migration, population policies—eugenics and birth control.

129 Race and Minority Groups (3)

Analysis of relationships between dominant and minority groups in society, particularly in the United States; nature and range of problems; analysis of the phenomenon of prejudice.

130 Class, Status, and Power (3)

Analysis of distribution of resources and opportunities for participation, education, and social mobility in American society; international comparison; analysis of public policies which affect these distributions.

132 Political Sociology (3)

Analysis of problems involved in the study of power relations in society; distribution of power in society; types and processes of government; political participation and political mobilization.

134 Marriage and the Family (3)

Courtship as a social process, marriage and marital adjustment, development of the family, parent-child relations, family problems, disorganization, divorce, and family reorganization.

135 Juvenile Delinquency (3)

Factors producing delinquency, juvenile detention, the juvenile court, training schools, treatment of offenders.

136 **Criminology** (3)
Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions in urban society.

137 **Sociology of Law** (3)
Law as a social phenomenon and agency of social control. Problems of legal concepts, doctrines, and institution. Prerequisite: Soc 136.

139 **Society and the Deviant** (3)
Analysis of relationships of society, socialization, and deviancy. Social responses to deviancy and criminal offenders; rehabilitative programs in community, courts, and schools.

141 **Social Research Methods** (3)
Introduction to scientific method in the development of social theory and the solution to social problems. Prerequisite: Stat 53.

143 **Social Movements** (3)
General survey of the various forms of collective behavior (fads, panics, riots, social movements, etc.), and a more detailed study of the genesis, development, and decay of social movements and social revolutions.

144 **Public Opinion and Mass Communication** (3)
Communication process with emphasis on international communications, propaganda, and mass media; measurement of propaganda campaigns.

147 **Problems of Bureaucratic Organization** (3)
Analysis of theories of and behavior in large, bureaucratic organizations and their impact on American social life. Supervised work-practice in the Washington, D.C. community.

149 **Modern Sociological Theory** (3)
Systematic study of contemporary schools of sociological theory, both European and American development; evaluation of scientific contributions of each school. Prerequisite: Soc 101.

191 **Current Emphases in Sociology** (3)
Analysis and evaluation of recent developments in the general field of sociology. Topic changes each semester; may be repeated for credit.

201 **Concepts of Sociology** (3)
Systematic survey, critical analysis of sociological concepts. Emphasis on theoretical systems.

210 **Theoretical Foundations of Political Sociology** (3)
Sociological theory on the relationship of politics to the wider social system. Emphasis on concepts of power, alienation, ideology, political stability, conflict, and change.

211 **Seminar: Social Change** (3)
Comparative study of political processes concentrating on political development in Third World Nations.

228 **Seminar: Urban Social Problems** (3)
(Formerly 227–228 Seminar: Urban Social Problems [3–3])
A seminar designed to identify, isolate, and examine the social problems

most pronounced in urban areas, as well as to explore the existing urban policies and practices designed to alleviate such problems. Particular focus is upon selected urban institutions as examined from a sociological perspective.

248 **Seminar: Organizational Theory and Behavior** (3)

Advanced analysis of theory and behavior in complex organizations relative to defining organizations, examining basic social processes and their relationship to the cultural environment.

263 **Seminar: Law and Society** (3)

Selected problems in law as an instrument of social policy; emphasis on the organization of legal decision-making processes.

270 **Educational Sociology** (3)

Analysis of educational systems from institutional perspectives and as agencies of socialization; relationships of education in general to society, including technological, communal, and subcultural components.

271 **Sociology of the Youthful Offender** (3)

Factors producing delinquency, juvenile detention, the juvenile court, training schools, treatment of offenders.

272 **Social Disorganization** (3)

Analysis of factors contributing to disruption of social groups, institutions, and communities; study of attempts to establish social controls to prevent, minimize, or mitigate the effects of socially disruptive conditions and events.

273 **Deviant Behavior** (3)

Analysis of relationships of society, socialization, and deviancy. Social responses to deviancy and criminal offenders; rehabilitative programs in community, courts, and schools.

anish*

irman: J.F. Burks, Professor of French; Monroe 429, Telephone 676-6330

Placement Examination: A student who has not been granted advanced standand who wishes to continue in college the language begun in high school must a placement examination before registration. Upon completion of the examinaassignment is made to the appropriate course.

1–2 **First-year Spanish** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Span 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Spanish prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year Spanish** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Span 4. Conversation, grammar, composition, reading of modern

*ministered by the Department of Romance Languages and Literatures.

Spanish prose, introduction to Hispanic civilization. Aural training, oral practice in language laboratory. Prerequisite: Span 1–2, or two years of high school Spanish. Laboratory fee, $17.50 a semester.

Special Education

Chairman: Perry Botwin, Professor of Special Education; C-429, Telephone 676-6170

170 **Interpersonal/Intrapersonal Relationships for Special Education Teachers** (3)
Consideration of factors leading to successful interaction with children.

200 **Understanding Young Exceptional Children** (3)
Lecture and field experience. Application of the basic concepts of early child development as applied to special education.

201 **Introduction to Special Education** (3)
Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommodate children in a school program.

222 **Special Education in the Regular Classroom** (3)
Special techniques and materials for regular classroom teachers to assist children who have learning and/or behavior problems; emphasis on specific, practical strategies and applications. Open to undergraduate seniors.

240 **The Crisis-Resource Teacher** (3)
Rationales, operational models, techniques, and problems relevant to the implementation of crisis-resource teacher programs.

241 **Preprofessional Internship: Crisis-Resource Teaching** (6)
Practicum experience early in the training sequence in crisis-resource teaching. Under the direction of qualified teachers in a field setting. A minimum of 280 clock hours required.

242 **Specialized Techniques and Materials for Crisis-Resource Teachers** (3)
Lectures, discussions, techniques, and selected materials exploring the psycho-educational factors used in crisis-resource teaching. Admission by permission of instructor.

250 **Specialized Techniques and Materials for Diagnostic-Prescriptive Teachers** (3)
Selected materials and techniques used in diagnostic-prescriptive teaching. Must be taken concurrently with SpEd 252. Admission by permission of instructor.

251 **Psychosocial Factors in Special Education** (3)
Psychosocial factors significant to the process of the special education school-based consultant. Admission by permission of instructor.

252 **Preprofessional Internship for Diagnostic-Prescriptive Teachers** (6)
Supervised school experience in diagnostic-prescriptive teaching. Must be taken concurrently with SpEd 250. Admission by permission of instructor. A minimum of 280 clock hours required.

253 **The Humanizing Curriculum and the Special Education Consultant** (3)

Curriculum concepts and modification aimed at enhancing the classroom environment for learning and growth. Admission by permission of instructor.

260 **The Assessment Process: Identification and Psycho-educational Assessment of Young Exceptional Children** (3)

Lectures, demonstrations, and clinical practice in formal and informal assessment procedures. Admission by permission of instructor.

261 **The Teaching/Learning Process: Methods and Materials for Young Exceptional Children** (3)

Clinical practice in the designing of educational strategies and materials; taught in a special education setting. Admission by permission of instructor.

262 **Seminar: the Education of Young Exceptional Children** (3)

Weekly seminar dealing with experiences, problems, and concerns encountered during the internship for the education of young exceptional children. Must be taken concurrently with SpEd 292. Admission by permission of instructor.

263 **Introduction to the Education of the Severely and Multiply Handicapped** (3)

Survey of the characteristics and learning patterns of children with severe disabilities. Lecture and field experience.

264 **Advanced Study in the Special Education of Severely and Multiply Handicapped Children** (3)

Specialized programs, techniques, and methods for teaching children with severe disabilities.

266 **Problems in Language Development in Exceptional Children** (3)

Introduction to the study of language acquisition and the application of current research on language of handicapped children.

267 **The Role of the Early Childhood Special Educator** (3)

Examination of the spectrum of roles available in early childhood special education; emphasis on role expectations and psychosocial dynamics of the various settings.

268 **The Development of Young Exceptional Children with Emphasis on Handicapping Conditions** (3)

Lecture (2 hours), site visitation (3 hours), discussion (2 hours).

269 **Psychosocial Concerns of the Early Childhood Special Educator** (3)

Seminar involving student presentations focusing on sociological and psychological constructs relevant to interpersonal/intrapersonal relationships.

270 **Adapting the Early Childhood Curriculum to Meet Special Needs** (3)

Review of the basic curriculum areas as they relate to the development of readiness skills in special education.

291 **Practicum in Crisis-Resource Teaching** (9)
Supervised field experience in the crisis-resource teacher program. Under the direction of a qualified teacher and the supervision of the University staff. Minimum of 420 clock hours required.

292 **Professional Internship in Education of Young Exceptional Children** (9)
Supervised internship in the education of young exceptional children. A minimum of 420 clock hours required. Must be taken concurrently with SpEd 262.

294 **Practicum in Diagnostic-Prescriptive Teaching** (9)
Supervised field experience in diagnostic-prescriptive teacher programs. A minimum of 420 clock hours required. Admission by permission of instructor.

303 **Administration and Supervision of Special Education** (3)
Philosophy and nature of special education; litigation, program organization, administration, and development. Surveying local-level needs; program evaluation and supervision. Admission by permission of instructor.

306 **The Design of Family Education Programs: Theory and Practice** (3)
Theoretical foundations and clinical practice in working with parents and community agencies in meeting the educational needs of young exceptional children.

350 **The Diagnostic-Prescriptive Teacher** (3)
Rationale, operational models, techniques, and problems relevant to implementation of diagnostic-prescriptive teacher programs. Admission by permission of instructor.

351 **Seminar: School-based Consultants in Special Education** (3)
Current practices in regular and special education as they affect the school-based consultant; emphasis on concurrent field experience. Admission by permission of instructor.

352 **Seminar: Special Education Consultant Programs in the Schools** (3)
For school-based consultants in special education; focuses on in-school program development and recent trends in processes and procedures. Admission by permission of instructor.

370 **Intrapersonal Dynamics in Special Education** (3)
Small group exploration of intrapersonal factors essential to understanding roles and interpersonal techniques in teaching exceptional children. Admission by permission of instructor.

Speech and Drama

Chairman: L.S. Bowling, Professor of Speech and Hearing, Auditorium 6, Telephone 676-6350

1 **Communicative Speaking and Listening** (3)
Basic theories and principles of speech communication; composition, delivery, and criticisms of speaking in interpersonal, group, and public situations. Recording fee, $4.

11 **Voice and Diction** (3)

Development of naturalness, correctness, and clarity in conversational speech. Analysis and correction of individual speech delivery faults through tapes and weekly performances. Recording fee, $4.

32 **Oral Interpretation of Literature** (3)

Theory and practice in discovering and communicating orally the meaning in literature through analysis of form and content. Techniques of reading prose, poetry, and drama for listeners. Prerequisite: SPDR 11. Recording fee, $2.

45 **Understanding the Theatre** (3)

The art of the theatre; its literature, aesthetics, and mechanics. Contributions of the playwright, actor, director, and designer examined through lectures, visiting artists, class discussions, and attendance at theatrical performances. Primarily for nonmajors.

91 **Parliamentary Procedure and Group Participation** (3)

Principles and procedures for effective speech communication to function successfully at various levels of responsibility in academic, social, professional, civic, or business organizations. Prerequisite: SPDR 1 or 11, or permission of instructor.

*111 **Business and Professional Speaking** (3)

Study of the communication process in business and professional speaking; practice in presenting technical reports; selling policies, programs, and services; interviews; conferences; speech in training and supervisory activities. Primarily for nonmajors.

121 **Group Discussion and Conference Leadership** (3)

Process of thinking and problem-solving in committees and small groups; methods of leading discussions and conferences. Prerequisite: SPDR 1 or permission of instructor.

stics

man: Jerome Cornfield, Professor of Statistics; C-311, Telephone 676-6356

rtmental prerequisite: One entrance unit in algebra is prerequisite to courses tics numbered below 100.

*151 **Introduction to Business and Economic Statistics** (3) (Campus Course)

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $18.

153 **Introduction to Statistics in Social Science** (3) (Campus Course)

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests by hypotheses, correlation, analysis of variance. Laboratory fee, $18.

---

ome can be adapted to the needs of a specific group.
1, which is offered off campus, may be substituted.

101–2 **Basic Principles of Statistical Methods** (3–3)

Variables and attributes, averages and dispersion, elementary principles of sampling, introduction to the making of statistical decisions. Prerequisite to Stat 102: Stat 101.

105 **Statistics in the Behavioral Sciences and Education** (3) (Campus Course)

Lecture (3 hours), laboratory (1 hour). Advanced study of statistical techniques for research problems. Analysis of variance, correlation techniques, nonparametric techniques, sampling theory. Prerequisite: Stat 53 or former 104. Laboratory fee, $18.

107 **Statistics for Engineers** (3)

Probability models, discrete and continuous distributions, sampling, hypothesis testing and estimation, engineering applications. Prerequisite: differential and integral calculus.

111 **Business and Economic Statistics I** (3) (Campus Course)

Statistical processes as tools in decision-making in areas of economics and business. Admission by permission of instructor.

112 **Business and Economic Statistics II** (3) (Campus Course)

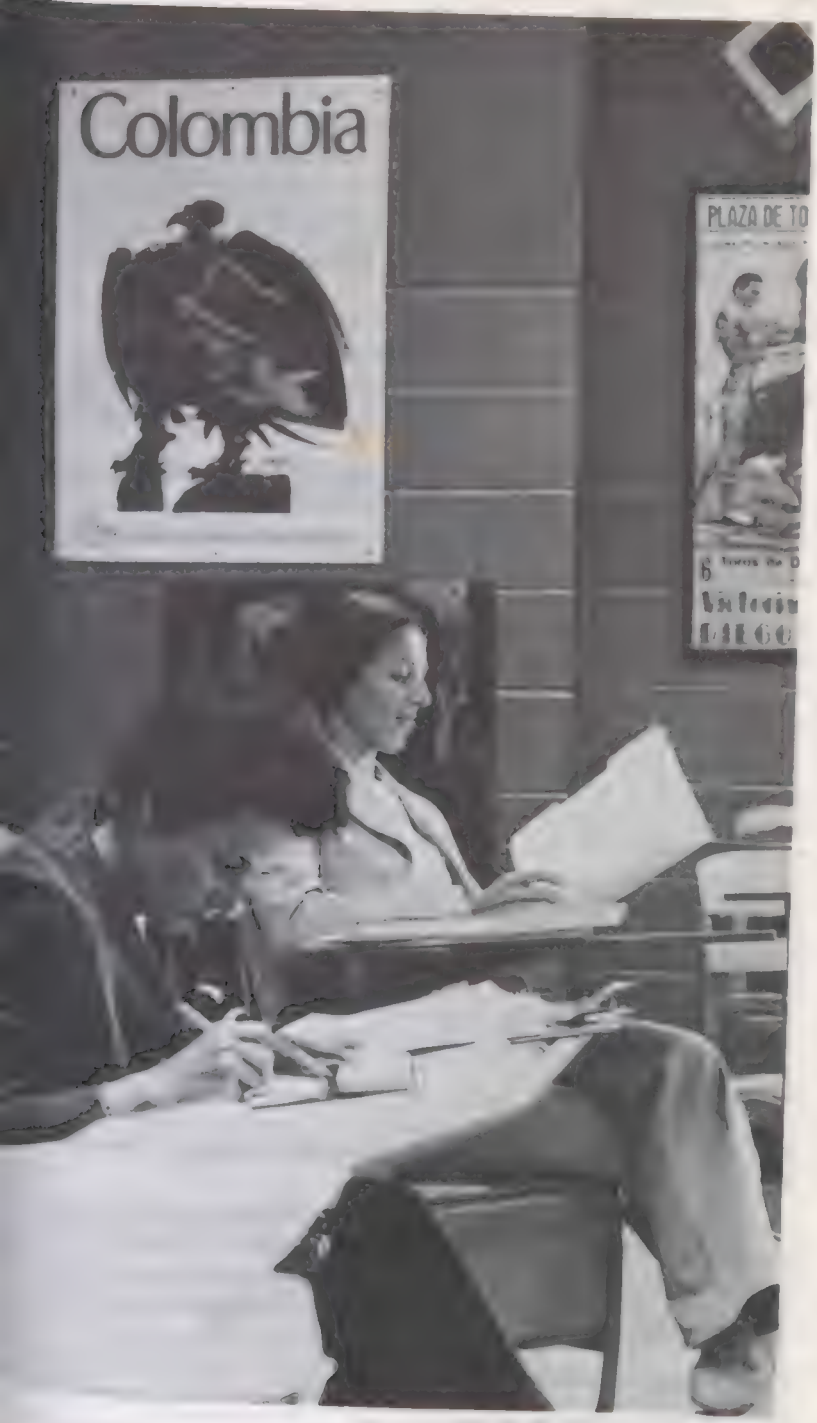
Case work to illustrate quantitative procedures for solution of economic and business problems. Prerequisite: Stat 111 or equivalent.

Telecommunication Operations

Faculty Adviser: D.A. Rowley, Associate Professor of Chemistry; Bacon 201, Telephone 676-6210

240 **Seminar in Telecommunication Policy and Regulations** (3)

International and domestic telecommunications institutions; the policy and regulatory process; spectrum management; cable telecommunications systems; common carrier/microwave transmissions system; mobile system; broadcasting-AM, FM, UHF, VHF-TV; satellites; United States domestic satellites; mobile satellite system; international telecommunications law; environmental impact; United States government systems; INTELSAT.


Colombia
PLAZA DE TO

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate* and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs† of The George Washington University as soon after order is restored as is practicably possible.

---

* The University Senate has been renamed the Faculty Senate.
† The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction: it accepts the former as a legitimate expression of dissent while regarding the latter as an abridgement of the freedoms of the individuals who may be its object.

e following was approved by the University's Board of Trustees on October 1968*:

he George Washington University is opposed to discrimination based on color, creed, sex, or national origin. Such discrimination may have ap- ed in campus organizations in the past. In the future, however, no organi- n can be recognized or supported by the University unless it provides con- ed assurance of nondiscrimination in membership practices and in intent, dered adequate by relevant committees and officers of the University.

following was approved by the University's Board of Trustees on October 968:

e University cannot condone violations of law, including violation of those which proscribe possession, use, sale, or distribution of certain drugs. Mem- of the academic community should know that administrative action, which clude dismissal from the residence halls, revocation of other privileges, pension or dismissal from the University, may be taken in order to pro- e interests of the University and the rights of others.
e Board of Trustees reaffirms the responsibility of the President and the ty to continue to implement this policy.

llowing resolution, submitted by the University Senate, was approved by iversity's Board of Trustees on January 16, 1969:

resolved by the Senate of The George Washington University: Any mem- f the University (including as members of the University all persons hav- ormal connection with the University)
who engages in conduct that unreasonably obstructs teaching, research, ning, or

* January 18, 1973.

(b) who unreasonably obstructs free access to members or guests of the Uni-
versity or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the
University,

may be punished for his conduct by dismissal from the University, or by some
lesser disciplinary action, through procedures established within the University
for the government of its members.

In order to insure due process, any student subject to dismissal or other
disciplinary action on the grounds of violating any of the premises of this reso-
lution shall have, at his discretion, the right of review of the action by the Uni-
versity Hearing Committee on Student Affairs.*

* The duties and functions of the Hearing Committee on Student Affairs are now performed by
Student-Faculty Committee on Appeals.

INDEX

breviations for courses, 97
sence, regulations concerning, *see* Attendance
ademic status:
Of the College of General Studies, 15
Of the University, 9–10
ademic work load, 30–31
celerated Associate's Degree completion program, 59
counting courses, 98–99
counting concentration curriculum, B.S. in Adm. degree, 51–52
creditation, 9–10, 15
oustics, M.S. field, 73
ministration, officers of, 12–13
ministration of science and technology, M.S. in Adm. area of concentration, 7–68
mission, 16–22
anced standing and placement, 8–20, 21, 22–23, 47, 57–59, 61
pace engineering, M.S. field, 73
Sigma Lambda, 40
Alumni association, 10
Alumni career services, 41
American Civilization courses, 100
American College Testing Program, 17–18
Anthropology courses, 100–01
Appendix: recently established regulations, 172–74
Application:
Fee, 17, 26
For admission, 16–23
For degree candidacy, 17–23
For graduation, 36
Applied Science courses, 118–19
Army Help for Education and Development (Project AHEAD), 59
Art courses, 101–02
Associate in Arts in General Studies degree, 47–48, 58
Astronomy course, 152
Attendance, 31, 37
Auditing, 24, 29

helor's degree, 46–47, 48–59
ance sheet, 35
avioral sciences in organization velopment, M.S. in Adm. area of ncentration, 68–69
logical Sciences courses, 102
rd of Trustees, 11–12
Bookstore, 40
Business Administration concentration curriculum, B.S. in Adm. degree, 50–53
Business Administration courses, 102–08
Business financial management, M.S. in Adm. area of concentration, 69

ndar for 1975–76, 4–6
ss study, 30, 48, 60, 62–63, 64, 76
er services office, student and rmal, 41
graphy courses, 108–09
ors in program of studies, 34, 36
istry course, 109–110
ce courses, 110
Engineering courses, 119–21
ge Entrance Examination Board
llege-Level Examination Program
EP), 19, 57–58
e Entrance Examination Board
17, 19
ges, schools, and divisions of the versity, 8–9
Columbian College of Arts and Sciences Special Department Examination, 20, 26, 58
Committee on scholarship, 14
Comprehensive examination, Master's, 62, 64, 67, 75
Computer Science:
Courses, 121–22
M.S. field, 73
Concurrent registration, 24
Conduct, 37, 172–74
Consortium of Universities of the Washington Metropolitan Area, Inc., 24
Continuing education for women, 41–45
Continuous registration, 26, 36

Correspondence courses, 20, 58
Counseling, 40, 41, 44–45
Course numbers, explanation of, 96–97
Course substitution, 66
Courses of instruction, 96–170
Credit, 35, 97
Criminal Justice concentration, M.A. in Sp.Std., 78

D

Dean's Council, 14
Dean's List, 37
Degree candidacy, admission to, 17–23
Degree programs, 15–16, 46–80
  Associate in Arts in General Studies, 46–48, 59
  Bachelor of General Studies, 46–47, 48–50
  Bachelor of Science in Administration, 46–47, 50–53
  Bachelor of Science in Geodetic and Cartographic Science, 46–47, 53–55
  Bachelor of Science in Oceanography, 46–47, 55–56
  Doctor of Science, 23, 76–78
  Education Specialist, 22–23, 62
  Master of Arts, 60
  Master of Arts in Education, 20, 60–62
  Master of Arts in Special Studies, 21–22, 63–65
    Criminal Justice concentration, 78
    Higher Education Affairs concentration, 78
    Legislative Affairs concentration, 78
    Urban Learning concentration, 79
    Women Studies concentration, 45
Degree programs (cont'd.):
  Master of Engineering Administration, 22, 76
  Master of Science, 22, 73–76
  Master of Science in Administration, 21, 64–72
  Industrial College of the Armed Forces program, 79
  Master of Science in Special Studies, 21–22, 62–64
  Environmental Studies concentration, 79
  Social and Economic Statistics concentration, 79
  Telecommunication operations concentration, 79
Dishonesty, regulations concerning, 38
Dismissal of students, 39, 172–74
Dissertation, 37, 77
Distinction, degrees earned with, 37–38
Doctor of Science degree, 23, 76–78
Dropping courses, 34–35

E

Economics courses, 110–11
Education courses, 111–18
Education directors of area instruction, *see* Off-campus locations
Electrical Engineering:
  Courses, 122–24
  M.S. field, 73
Elementary education, M.A. in Ed. field, 60
Employment, student, 41
Engineering Administration:
  Courses, 125
  M.E.A. program, 76–78
Engineering and Applied Science courses, 118–31
Engineering Science courses, 125–29
English courses, 131–33
Entrance requirements, 16–23
Environmental Health courses, 133
Environmental Modeling, M.S. field, 7
Environmental Studies concentration, M.S. in Sp.Std., 79
Examinations:
  Admission Test for Graduate Study in Business, 21
  American College Testing Program, 17–18
  College Entrance Examination Board College-Level Examination Program (CLEP), 19, 57–58
  College Entrance Examination Board tests, 17, 19
  Columbian College of Arts and Sciences, Special Department, 20, 26, 58
  Final, for D.Sc. degree, 77

aminations (cont'd.):
For earning credit or waiving curriculum requirements, 19–20, 26, 57–58

rs and financial regulations, 24–30
al examination, D.Sc. degree, 77
ht sciences, M.S. field, 73

eral alumni association, 10
idesy courses, 137
letic and Cartographic Science, S. in, 46–47, 53–55
graphy and Regional Science urses, 138–39
logy courses, 139
manic Languages and Literatures urses, 139–40
rnment of the University, 10
ties, 31–33

lth Care Administration courses, 140
ew courses, 141
er education, M.A. in Ed. field, 60
er education affairs concentration, A. in Sp.Std., 78
ory courses, 141–42
ory of the University, 7–8

mplete:
signment of the grade of, 32
moval of, 46, 61, 64, 66, 74
tarial College of the Armed Forces, operative program with, 79
trial management, M.S. in Adm. a of concentration, 69

alism courses, 144

uage requirement, D.Sc. degree, 77
American Civilization, special gram, 144

Examinations (cont'd.):
Graduate Record, 22–23
Master's comprehensive, 62, 64, 67, 75
Qualifying, for D.Sc. degree, 77

Fluid mechanics and thermal sciences, M.S. field, 73
Forensic Science courses, 134–36
French courses, 136–37

Graduate degree candidacy, admission to, 20–23
Graduate degrees, 60–80
Graduate Record Examination, 22–23
Graduate Study in Business, Admission Test, 21
Graduation:
Application for, 36
Fee, 26
Requirements, 36–37

Honor societies, 40
Honorary Trustees, 12
Honors, 37–38
Human Kinetics and Leisure Studies courses, 142–43
Human resource development, M.A. in Ed. field, 60

Information systems technology, M.S. in Adm. area of concentration, 70
International commerce, M.S. in Adm. area of concentration, 70–71
Italian courses, 143

Leave of absence, 36–37, 74
Legal assistant training program, 43

Legislative Affairs concentration, M.A. in Sp.Std. degree, 78
Library, 38–39
Location of the University, 10

M

Management Science courses, 144–48
Managerial accounting, M.S. in Adm. area of concentration, 71
Master's comprehensive examination, 61, 62, 64, 67, 75
Master's degrees, 60–76, 78–80
Mathematics courses, 148–50
Mechanical Engineering courses, 129–31
Military leave, 36
Military transfer of students, 36–37, 57–58
Music courses, 150

N

Noncredit courses, 43
Nondegree programs, 16
Nondegree student, admission, 16–17

O

Objectives of the School of Government and Business Administration, 65
Ocean and marine engineering, M.S. field, 73
Oceanography:
B.S. in, 46–47, 55–56
Courses, 150–51
Off-campus locations of the College of General Studies, 81–96
Officers of Administration, 12–13
Operations research and systems analysis M.S. in Adm. area of concentration, 71–72

P

Payment of fees, 28–30
Personnel management, M.S. in Adm. area of concentration, 69
Pharmacology courses, 151–52
Phi Beta Kappa, 40
Philospohy courses, 152
Physical Science courses, 109–10
Physics courses, 152–53
Political Science courses, 153–56
Probation, 33–34
Procurement and contracting, M.S. in Adm. area of concentration, 72
Programs, right to make changes in, 39
Psychology courses, 156–58
Public Administration, M.S. in Adm. area of concentration, 72–73
Public Administration courses, 158–60

Q

Qualifying examination, D.Sc. degree, 77
Quality-point index, 18–19, 21, 32–3 37–38, 51, 54, 55, 61, 63, 66, 74, 77

R

Readmission, 23
Refund of fees, 29–30
Registration, 23–24
Regulations, 30–39, 172–74
Financial, 24–30
Release of student information, policy on, 39
Religion and medical care, M.A. field, 6
Religion courses, 160–61
Residence, 36–37
Requirements, 47, 58, 61, 63, 65–6 74
Rules of the University, right to chang 39
Russian courses, 161–62

holarship, committee on, 14
Scholarship requirements, 31–34, 48, 49, 51, 54, 55, 61, 62, 63, 66, 74, 77–78
condary education, M.A. in Ed. field, 60
mester hours, explanation of, 97
rvice schools, credit through, 20, 58
rvicemen's Opportunity College (SOC), 57–59
vic Languages and Literatures courses, 161–62
cial and Economic statistics concentration, M.S. in Sp.Std., 79
ciology courses, 162–65
id mechanics and materials science, M.S. field, 73
anish courses, 165–66
ecial credit programs, 16
Special Education:
Courses, 166–68
M.A. in Ed. field, 60
Special honors, 37–38
Speech and Drama courses, 168–69
Statistics courses, 169–70
Structures and dynamics, M.S. field, 73
Student and alumni career services office, 41
Student information, release of, 39
Student services, 40–41
Supervision and human relations, M.A. in Ed. field 60
Suspension, 34, 172–74
Systems analysis, operations research and, M.S. in Adm. area of concentration, 71–72
Systems science, M.S. field, 73

lecommunication Operations, M.S. in Sp.Std. concentration, 79–80
Communication Operations courses, 71
erapeutic Recreation/Adaptive Physical Education, M.A. in Ed. field, 60
rmal sciences, M.S. field, 74
sis, 24, 26, 27, 37, 61, 63, 66, 74
me to complete M.S. and M.E.A. egree requirements, 75
Tool requirement, D.Sc. degree, 77
Transcripts of record, 19, 23, 26, 35
Transfer:
From other institutions, 18–19, 21, 22, 23, 47, 57–59
Within the University, 21, 35, 47
Trustees, Board of, 11–12
Tuition, 24–27
Projected increases, 1976–79, 26–27

ndergraduate degree candidacy, admission to, 17–23
ndergraduate degrees, 46–59
versity bookstore, 40
University Center fee, 25
Projected increase, 27
Urban learning concentration, M.A. in Sp.Std., 79

eans education, 40–41

er examinations, 20, 26, 58–60
rses, 33
ithdrawal 28–30, 32, 35, 64
Women, continuing education for, 41–45
Women Studies concentration, M.A. in Sp.Std., 45

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and should be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the College

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE AND HEALTH SCIENCES, Admissions Office, School of Medicine and Health Sciences

SUMMER SESSIONS CATALOGUE, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL (Preregistration), FALL (Revised), and SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

OLLEGES AND SCHOOLS—DEGREE PROGRAMS

LUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.), chelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and rt.Sc.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

ADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of ts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.Forens.S.), Master of Music (Mus.M.), Master of ence (M.S.), Master of Science for Teachers (M.S. for Teachers), Master Science in Forensic Science (M.S. in Forens.S.), Master of Science in Spe- Studies (M.S. in Sp.Std.), and Doctor of Philosophy (Ph.D.)

HOOL OF MEDICINE AND HEALTH SCIENCES: Associate in Science (A.S.), chelor of Science (B.S.), Bachelor of Science in Medical Technology (B.S. in d. Tech.), and Doctor of Medicine (M.D.)

TIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master Comparative Law (M.Comp.L.), Master of Comparative Law (American ctice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

HOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil gineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), ter of Engineering Administration (M.E.A.), Master of Science (M.S.), Doctor of Science (D.Sc.)

HOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor cience in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master rts in Education (M.A. in Ed.), Master of Arts in Teaching (M.A.T.), cation Specialist (Ed.S.), and Doctor of Education (Ed.D.)

HOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business ministration (B.B.A.), Bachelor of Science in Administration (B.S. in .), Bachelor of Science in Health Care Administration (B.S. in H.C.A.), ter of Arts in Government (M.A. in Govt.), Master of Arts in Health Administration (M.A. in H.C.A.), Master of Business Administration B.A.), Master of Public Administration (M.P.A.), Master of Science in inistration (M.S. in Adm.), Master of Urban and Regional Planning of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Administration (Grad.Cert. in H.C.A.), Doctor of Business Administra- (D.B.A.), and Doctor of Public Administration (D.P.A.)

OL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), ter of Arts (M.A.), and Master of Science in International Affairs I.A.)

THE GEORGE WASHINGTON UNIVERSITY

COLUMBIAN COLLEGE OF ARTS AND SCIENCES, 1821

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE AND HEALTH SCIENCES, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

THE DIVISION OF UNIVERSITY STUDENTS, 1930

THE COLLEGE OF GENERAL STUDIES, 1950

THE SUMMER SESSIONS, 1916

THE UNIVERSITY HOSPITAL, 1898

THE DIVISION OF EXPERIMENTAL PROGRAMS, 1973

E GEORGE WASHINGTON UNIVERSITY BULLETIN
Vol. LXXIV No. 3, March 1975



SUMMER SESSIONS CATALOGUE

1975



/ WASHINGTON, D.C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
Volume LXXIV, Number 3, March, 1975

Published by The University at Washington, D. C. 20052

MONTHLY: DECEMBER, JUNE, JULY
(2 ISSUES IN APRIL, MAY, 3 ISSUES IN MARCH)

Second Class Postage Paid at Washington, D. C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN

THE SUMMER SESSIONS 1975

WASHINGTON, D.C. 20052

FACTS ABOUT GEORGE WASHINGTON UNIVERSITY

General Information	Private, nonsectarian, coeducational, founded 1821
Location	Washington, D.C., bounded by Pennsylvania Avenue and 19th, F, and 24th Streets, N.W.
Number of Students 1974 Summer Sessions	5,721
Geographical Origin of Students 1974 Summer Sessions	50 states, District of Columbia, American Samoa, Puerto Rico, Virgin Islands, 87 foreign countries
Number of Full-time Faculty 1974 Summer Sessions	203
Number of Part-time Faculty 1974 Summer Sessions	117
Residence Hall Rates 1975 Summer Sessions	Multiple occupancy, $175 a five-week session; single occupancy, $225 a five-week session (see page 24)

Undergraduate majors: Accounting, American Civilization, American Literature, An thropology, Applied Mathematics, Applied Statistics, Art History, Biology, Botany Business Administration, Cartography, Chemistry, Chinese Language and Literature East Asian Studies (China and Japan), Civil Engineering, Classical Archaeology an Anthropology, Classical Archaeology and Classics, Classical Humanities, Dramat Art, Economics, Electrical Engineering, Elementary Education, English Literatur Environmental Health, Environmental Studies, Fine Arts, French Language and Li erature, Geodesy, Geography, Geology, Germanic Languages and Literatures, Histor Human Kinetics and Leisure Studies, International Affairs, Journalism, Judaic Studie Latin, Latin American Studies, Mathematical Statistics, Mathematics, Mechanical E gineering, Medical Technology, Music (Applied, History and Literature, Theory Nurse Anesthetist Program, Nurse Practitioner Program, Oceanography, Philosoph Physician's Assistant Program, Physics, Political Science, Premedicine, Psycholog Public Affairs, Radiologic Sciences and Administration, Religion, Russian Langua and Literature, Russian Literature and Culture—in Translation, Secondary Educatio Sociology, Spanish American Literature, Spanish Language and Literature, Spee Communication, Speech Pathology and Audiology, Urban Affairs, Zoology.

Study leading to graduate or professional degrees is offered in the Graduate Scho of Arts and Sciences, the National Law Center, the School of Medicine and Heal Sciences, the School of Engineering and Applied Science, the School of Educatio the School of Government and Business Administration, and the School of Publ and International Affairs.

CONTENTS

A Summer Semester in the Nation's Capital
Calendar for the 1975 Summer Sessions
The University
  History and Organization
  Academic Status
  Educational Facilities
  Consortium of Universities of the Washington Metropolitan Area, Inc.
  The Board of Trustees
  Officers of Administration
The Summer Sessions
  Admission
  Registration
  Fees and Financial Regulations
  University Regulations
  Student Services and Activities
    Student Health Service
    The Reading Center
    Counseling Center
    The Speech and Hearing Clinic
    Veterans Education
    Residence Hall
    Cloyd Heck Marvin Center
    Student and Alumni Career Services Office
    Social and Recreational Program
The Colleges, Schools, and Divisions
  Columbian College of Arts and Sciences
  The Graduate School of Arts and Sciences
  The National Law Center
  The School of Engineering and Applied Science
  The School of Education
  The School of Government and Business Administration
  The School of Public and International Affairs
  The College of General Studies
  The Division of University Students
  The Division of Experimental Programs
Special Programs and Workshops
Courses of Instruction
Appendix: Recently Established Regulations
Index

A SUMMER SEMESTER IN THE NATION'S CAPITAL

THE GEORGE WASHINGTON UNIVERSITY offers a two-term summer program which makes it possible for students to earn 14 semester hours of credit during the summer months. The Library, classrooms, and residence hall are air-conditioned. For term dates, see the calendar on pages 5 and 6.

ALENDAR FOR THE 1975 SUMMER SESSIONS

ication for Graduation—An "Application for Graduation" form *must* be and the appropriate fee paid at the time of registration for the summer on of the senior or final year. Students completing degree requirements g the Summer Sessions will be awarded diplomas (no formal convocation) mber 30, 1975, provided they have completed all degree requirements and applied for graduation as a part of registration for the Summer Sessions.

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

GRADUATE SCHOOL OF ARTS AND SCIENCES

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

SCHOOL OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

DIVISION OF UNIVERSITY STUDENTS

First Session

June 2	Registration for first 5-week session, 7- and 8-week courses (10 am–7 pm) *Monday*
June 3	First 5-week session classes, 7- and 8-week courses begin *Tuesday*
June 18	D.B.A., D.P.A., and Ph.D. dissertations completed in the summer due in appropriate Dean's Office *Wednesday*
July 4	Holiday *Friday*
July 8	First 5-week session classes end *Tuesday*
July 9	First 5-week session examination day *Wednesday*
July 21	Seven-week courses end *Monday*
August 13	Master's theses completed in summer due in appropriate Dean's Office *Wednesday*

Second Session

July 10	Registration for second 5-week session (10 am–6 p *Thursday*
July 11	Second 5-week session classes begin *Friday*
August 13	Master's theses completed in summer due in appropri Dean's Office *Wednesday*
August 14	Second 5-week session classes end *Thursday*
August 15	Second 5-week session examination day *Friday*

NATIONAL LAW CENTER

May 27	Registration for all sessions (12–7 pm) *Tuesday*
May 28	First session and 13-week session begin *Wednesday*
July 4	Holiday *Friday*
July 7	First-session classes end *Monday*
**July 9–11*	First-session examination period *Monday–Wednesday*
July 11	Registration for students attending second session o (2–6 pm) *Friday*
July 14	Second-session classes begin *Monday*
August 20	Last day of classes *Wednesday*
August 21–23	Second-session and 13-week session examination peri *Thursday–Saturday*

SCHOOL OF EDUCATION

June 16	First 3-week workshop session registration (10 am–7 pm classes begin *Monday*
July 3	First 3-week workshop session classes end *Thursday*
July 4	Holiday *Friday*
July 7	Second 3-week workshop session registration (9 am–6 pm classes begin *Monday*
July 7	Ed.D., Ed.S., and M.A. in Ed. July comprehensive exami tion applications due *Monday*
July 19	National Teacher Examinations *Saturday*
July 25	Second 3-week workshop session classes end *Friday*
July 26	Ed.D., Ed.S., and M.A. in Ed. comprehensive examinati *Saturday*
July 28	Third 3-week workshop session registration (9 am–5 pm classes begin *Monday*
August 15	Six-week session and third 3-week workshop session clas end *Friday*
August 15	Ed.D. dissertations completed in summer due *Friday*

FALL SEMESTER 1975–76

August 28–30	Registration *Thursday–Saturday*

* Classes scheduled Wednesday evenings for the 13-week session will meet on Wednesday, July

THE UNIVERSITY

ORY AND ORGANIZATION

GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Colum- College in the District of Columbia. The name of the institution was ged in 1873 to Columbian University and in 1904 to The George Wash- n University. The debt of the University to George Washington, whose e it bears, is an intangible one.

orge Washington, as President and as private citizen, had urgently insisted the establishment of a National University in the federal city. There he that, while being instructed in the arts and sciences, students from all of the country would acquire the habits of good citizenship, throwing off prejudices and gaining at first hand a knowledge of the practice, as well theory, of republican government. To further the materialization of his Washington left a bequest of fifty shares of The Potomac Company rds the endowment of a University to be established within the limits of istrict of Columbia, under the auspices of the General Government, if government should incline to extend a fostering hand towards it." The ress never extended "a fostering hand." The Potomac Company passed existence, and Washington's bequest became worthless.

lly conscious of Washington's hopes, but motivated primarily by a great onary urge and the need for a learned clergy, a group of dedicated ers and laymen sponsored a movement for the establishment of a college e District of Columbia. Inspired largely by the zeal and energy of the end Luther Rice, they raised funds for the purchase of a site and peti- Congress for a charter. After much delay and amendment, Congress d a charter which was approved by President Monroe on February 9, To safeguard the College's nonsectarian character it provided "that per- of every religious denomination shall be capable of being elected Trustees; hall any person, either as President, Professor, Tutor or pupil, be refused tance into said College, or denied any of the privileges, immunities, or ntages thereof, for or on account of his sentiments in matters of religion." ring the entire time when the institution was known as Columbian Col- its activities were centered on College Hill, a tract of forty-six and a half between the present Fourteenth and Fifteenth Streets extending north Florida Avenue to somewhat beyond Columbia Road. The Medical School ocated downtown. For the better part of the Columbian University period, uildings of the University were situated along H Street between Thirteenth Fifteenth Streets.

During the last half century the University's present plant has been deve
oped in that section of the old First Ward familiarly known as "Foggy Bottom
between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenu
Within a few blocks are the White House, the Department of the Interior, th
State Department, the World Bank, and many other governmental offices an
international agencies. The area is not without its reminders of historic intere
to the University. President Monroe, who signed the Charter, lived at 201
Eye Street. The first President of the Board of Trustees, the Reverend Obadia
B. Brown, was for fifty years the pastor of a church at Nineteenth and Ey
Streets, and Washington selected Twenty-third and E Streets as the site of th
National University he hoped to see established.

The University as it is now organized consists of Columbian College of Ar
and Sciences (undergraduate); the Graduate School of Arts and Sciences; th
professional schools, which include the National Law Center and the schoo
of Medicine and Health Sciences, Engineering and Applied Science, Educatio
Government and Business Administration, and Public and International Affair
the Division of University Students; the College of General Studies; the Sum
mer Sessions; and the Division of Experimental Programs.

The George Washington University is privately endowed and is governed b
a self-perpetuating Board of Trustees of which the president is an ex offici
member.

ACADEMIC STATUS

The George Washington University is accredited by its regional accreditin
agency, the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of Un
versity Women and is a member of the College Entrance Examination Boar

The National Law Center is a charter member of the Association of Amer
can Law Schools and is approved by the Section of Legal Education and Ad
missions to the Bar of the American Bar Association. The School of Medicin
is a member of the Association of American Medical Colleges and is one o
the medical colleges which have been continuously approved by the America
Medical Association. Curricula of the School of Engineering and Applie
Science in Civil, Electrical, and Mechanical Engineering are accredited by th
Engineer's Council for Professional Development. The School of Education
a charter member of the American Association of Colleges for Teacher Edu
cation and is accredited by the National Council for Accreditation of Teache
Education for its Bachelor's and Master's degree programs. The School o
Government and Business Administration has maintained full membership i
the Middle Atlantic Association of Colleges of Business Administration sinc
1961. It joined the Council on Graduate Education for Public Administratio
in 1966. By invitation, in 1968, the School became a charter academic mem
ber of the American Association of Collegiate Schools of Business Assembly
The programs in Public Accounting designed to prepare students for Certifie
Public Accountants examinations have been approved by the state boards o
New York and of Maryland. The Program in Hospital Administration
accredited by the National Accrediting Commission on Graduate Educatio
for Hospital Administration. The Department of Chemistry is on the approve
list of the American Chemical Society. The graduate program in clinical psy
chology in the Department of Psychology is on the approved list of the Amer
can Psychological Association.

CATIONAL FACILITIES

he University Library.—The University Library contains approximately 340 volumes and, with the exception of the law and medical collections, is ed in the Library Building.

egulations governing the use of the Library, the circulation of books, and se of reserve books and periodicals are available at the service desks of ibrary.

her Library Facilities in Washington.—The student has access also to the ry of Congress, the Public Library of the District of Columbia and its hes, the Library of the Pan American Union, the Library of the Bureau ailway Economics, the Library of the United States Department of Agri-re, the Library of the United States Office of Education, the National ry of Medicine, the Library of the Smithsonian Institution, and many great special collections of the government departments.

search Facilities of Washington.—The arrangement of the summer sched-of classes permits the full-time student to avail himself of the opportunity dy, at first hand, the working of the federal government and so to form kground for intelligent and useful citizenship.

the departmental libraries of the federal government are a multitude of ts made by eminent specialists in all fields of science on the results of and research in the bureaus, experimental stations, laboratories, museums, bservatories of the nation.

addition to the governmental collections the student has available the rch facilities of such scientific and educational groups, whose headquarters situated in Washington, as the Carnegie Institution, the American Council ducation, the National Academy of Sciences, the National Research cil, the National Education Association, and the National Geographic ty.

ORTIUM OF UNIVERSITIES OF THE WASHINGTON METROPOLITAN A, INC.

niversities in Washington, D.C.—American University, Catholic Univer-of America, *George Washington University*, Georgetown University, and rd University—are associated in a Consortium through which they coordi-the use of their respective facilities; District of Columbia Teachers Col-Gallaudet College, Mount Vernon College, and Trinity College are asso-members of the Consortium. Students in approved programs leading to es in any one of these institutions have the opportunity to select from the ned offerings of all the particular courses which best meet their needs.

ticipation is limited to campus degree candidates. The following, how-are excluded: students in Canon Law, Dentistry, Medicine, and Theology. tudents are also excluded from participation, except for candidates for the of Master of Laws at George Washington University and Georgetown sity.

pecial courses such as private instruction (as in music or art) or tutorial if a special fee is charged, this fee is not covered by the Consortium ent and must be paid by the individual student to the institution admin-the course. *A student may not take courses at another institution that ilable at his own.*

student registers and pays at his own institution for all Consortium s.

page 17 for information concerning registration for Consortium courses.

THE BOARD OF TRUSTEES

E.K. Morris, LL.D., D.P.S., *Chairman Emeritus*

Charles E. Phillips, LL.B., LL.M., *Chairman*
*Everett H. Bellows, M.A., *Vice Chairman*
James M. Mitchell, M.A., *Secretary*
*Thaddeus A. Lindner, B.A. in Govt., *Assistant Secretary*

Robert C. Baker, LL.D.
Joel Barlow, B.A., J.D., LL.D.
*Everett H. Bellows, M.A.
George M. Bunker, B.S.
Jacob Burns, LL.B., LL.D.
George A. Butler, LL.B.
Mortimer M. Caplin, B.S., LL.B., J.S.D., LL.D.
Leon Chatelain, Jr.
Henry C. Clausen, J.D.
Jacqueline Cochran, L.H.D., LL.D., Sc.D.
Donald C. Cook, B.A., M.B.A., J.D., LL.M., L.H.D., LL.D.
*Joseph B. Danzansky, B.A., J.D.
Frank G. Dickey, M.A., Ed.D., LL.D., D.Lit., L.H.D.
Nancy B. Dudley, B.A. in Govt.
John B. Duncan, B.A., LL.B., LL.D.
Lloyd H. Elliott, M.A., Ed.D., LL.D., *President of the University*, ex offic
Katharine Graham, B.A.
Melville B. Grosvenor, B.S., Sc.D., LL.D.
Joseph H. Hirshhorn
Joseph D. Hughes, B.S., J.D., LL.M., LL.D.
L.A. Jennings
David M. Kennedy, LL.B., M.A., LL.D.
*Sidney A. Levine, B.A., M.D.
Thaddeus A. Lindner, B.A. in Govt.
Franklin J. Lunding, LL.B., LL.D.
Jeremiah Milbank, B.A., M.B.A.
James M. Mitchell, M.A.
Donald W. Nyrop, B.A., LL.B.
Thornton W. Owen, B.S. in C.E., B.A.
Charles E. Phillips, LL.B., LL.M.
Flaxie M. Pinkett, B.A.
*Abe Pollin, B.A. in Govt.
S. Dillon Ripley II, Ph.D., L.H.D., Sc.D.
Orville F. Rush, J.D., LL.D.
Carleton D. Smith
Charles E. Smith
Douglas R. Smith, B.S.C.
Mark Sullivan, Jr., B.A.
John W. Thompson, Jr., B.A.
*William G. White, B.S. in C.E.

* Alumni trustee.

lin J. Wilson, LL.B.
nion W. Wise, Ph.B.
phen R. Woodzell, B.S. in E.E.
mes O. Wright, B.S., J.D.
seph S. Wright, LL.B., LL.D.

NORARY TRUSTEES

ther M. Bastian, LL.B., LL.D.
ry F. Duncan
well W. Ellison, B.A., LL.B., LL.D.
rles C. Glover, Jr., M.A., LL.B., LL.D.
oks Hays, B.A., J.D., LL.D., L.H.D., D.C.L., D.D., HH.D.
ed H. Lawson, LL.B., LL.D.
n K. McKee
jamin M. McKelway, Litt.D.
. Morris, LL.D., D.P.S.
frey L. Munter, B.A., LL.B., LL.D.
nander Wetmore, Ph.D., Sc.D.
yd B. Wilson

OFFICERS OF ADMINISTRATION

UNIVERSITY

H Hartman Elliott, M.A., Ed.D., LL.D., *President*
ld Frederick Bright, Ph.D., *Provost and Vice President for Academic airs*
our Alpert, B.A., M.D., *Vice President for Development*
in Cantini, Jr., J.D., *Vice President for Administration*
es Edward Diehl, B.Arch.Engr., B.C.E., M.B.A., *Vice President and Treas-rer*
Joseph Feffer, B.A., M.D., *Vice President for Medical Affairs*
an David Johnson, B.S., *Director of Planning and Budgeting*
Harkey Mayo, B.S., J.S.D., *Vice President for Policy Studies and Special jects*
rick Justin Naramore, B.S., C.P.A., *Comptroller*
m Parkhurst Smith, Jr., B.A., M.B.A., M.A. in Ed., *Vice President for dent Affairs*
t Gebhardtsbauer, M.A., *Registrar*
Young Ruth, B.A., *Director of Admissions*

COLLEGES, SCHOOLS, AND DIVISIONS

Darlington Linton, Ph.D., *Dean of Columbian College of Arts and Sci-es*
Solomon, Ph.D., *Dean of the Graduate School of Arts and Sciences*
Stanley Birnbaum, M.S. in M.E., B.C.E., *Dean for Administrative Affairs the Medical Center*

trustee.

Ronald Paul Kaufman, B.S., M.D., *Dean for Clinical Affairs of the Medic Center; Medical Director of the University Hospital*
John Patrick Naughton, B.S., M.D., *Dean for Academic Affairs of the Medic Center*
Robert Kramer, B.A., LL.B., *Dean of the National Law Center*
Harold Liebowitz, D.Ae.E., *Dean of the School of Engineering and Applie Science*
Rodney Tillman, Ed.D., *Dean of the School of Education*
Peter B. Vaill, B.A., D.B.A., *Dean of the School of Government and Busine Administration*
Burton Malcolm Sapin, Ph.D., *Dean of the School of Public and Internation Affairs*
John Gage Allee, Jr., Ph.D., *Dean of the Division of University Students*
Robert Lee Holland, Ph.D., *Dean of the College of General Studies*
William Francis Edward Long, Ph.D., *Dean of the Summer Sessions*
Clarence Cowan Mondale, Ph.D., *Director of the Division of Experiment Programs*
Lawrence Thompson Bowles, M.D., Ph.D., *Associate Dean for Curricular a Student Affairs of the Medical Center*
Fred Leonard, Ph.D., *Associate Dean for Research of the Medical Center*
Michael McCally, M.D., Ph.D., *Associate Dean for Allied Health Programs the Medical Center*
Dennis Sophian O'Leary, B.A., M.D., *Associate Dean for Professional Servic of the Medical Center*
W. Wallace Kirkpatrick, B.A., LL.B., *Associate Dean of the National La Center*
Edward Andrew Potts, B.A., LL.B., *Associate Dean of the National Law Ce ter, for Graduate Studies, Research, and Projects*
Salvatore Frank Divita, B.I.E., D.B.A., *Associate Dean for External Affairs the School of Government and Business Administration*
Charles McKay Chambers, Ph.D., *Associate Dean of the College of Gener Studies, for Planning and Development*
Alvin Carl Jensen, Ed.D., *Associate Dean of the College of General Studies*
Calvin Trexler Klopp, B.A., M.D., *Medical Director of the University Clinic*
Barbara Joan Dunham, M.A., *Assistant Dean of Columbian College of Ar and Sciences*
Joseph Louis Métivier, Jr., M.A., *Assistant Dean of Columbian College of Ar and Sciences*
Robert Clinton Rutledge, Ph.D., *Assistant Dean of Columbian College of Ar and Sciences*
Harry Elwood Yeide, Jr., Ph.D., *Assistant Dean of Columbian College of Ar and Sciences*
Edward Alan Caress, Ph.D., *Assistant Dean of the Graduate School of Ar and Sciences*
David Alton Rowley, Ph.D., *Assistant Dean of the Graduate School of Ar and Sciences*
Margaret Gallagher, B.S.N., M.A., *Assistant Dean for Nursing Services a Director of Nursing of the Medical Center*
Robert Keimowitz, M.S., M.D., *Assistant Dean for Admissions and Director Admissions (M.D. Program) of the Medical Center*

Winfield Harker Scott, Ph.D., *Assistant Dean for Education and Director of Education of the Medical Center*

James Elmer Feir, Ph.D., *Acting Assistant Dean of the School of Engineering and Applied Science*

Robert Edward Baker, M.A., Ed.D., *Assistant Dean of the School of Education*

John Lobuts, Jr., B.S., Ed.D., *Assistant Dean of the School of Government and Business Administration*

Thorn Karsten Netland, M.A., *Assistant Dean of the Division of University Students*

Ruth H. Osborn, Ed.D., *Assistant Dean of the College of General Studies, for Continuing Education for Women*

THE SUMMER SESSIONS

THE PROGRAMS OF THE SUMMER SESSIONS have been planned to meet the needs of full- and part-time students.

During the summer of 1975, Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Engineering and Applied Science, the School of Government and Business Administration, the School of Public and International Affairs, and the Division of University Students offer courses in two 5-week sessions, with some graduate seminars and courses extending over an 8-week period. The School of Engineering and Applied Science also offers courses in a 7-week period. The National Law Center offers courses in three sessions, and the School of Education offers courses in 6- and 9-week sessions and three 3-week workshop sessions. The School of Medicine and Health Sciences offers undergraduate courses in an 11-week period for the Physician's Assistant program.

The time at which each course is offered (session and hours) is stated at the end of the course description.

Admission

APPLICATION FOR ADMISSION OR READMISSION

THE APPLICATION FOR ADMISSION to degree candidacy should be accompanied by the appropriate application fee ($10, undergraduate; or $25, graduate). There is no application fee for the student who is applying for nondegree status in the Division of University Students.

NONDEGREE STATUS

Application for nondegree status in the Division of University Students should be received, with any required credentials, by the Friday before the registration date of the session for which admission is sought (see Calendar, pages 5 and 6). If credentials are required (see page 16) an earlier application is recommended.

DEGREE CANDIDACY

Students from secondary schools wishing to begin college as degree candidates, in either the first or second term of the summer session, should apply during

e fall term of the senior year. Preference will be given to students who bmit applications and required credentials prior to March 1.

Undergraduate transfer students from other institutions, applicants for gradu- programs, and *readmission applicants* must submit application and required edentials prior to May 1 for the first summer session and June 1 for the sec- ıd summer session.

---

ecords presented become the property of the University and *cannot* be re- rned.

PLICATION FORMS

e tearout postcard inside the back cover of this catalogue may be used to ply for admission or readmission to the University for nondegree status. An plicant for a degree program should request an application from the Office Admissions or the appropriate graduate admissions office. A student who nded the University in the spring semester of 1975 does not need to reapply attend the Summer Sessions.

STUDENT NOT SEEKING A DEGREE

e student not seeking a degree from this University should complete appli- ion for admission to the Division of University Students. (See paragraph ove.) This nondegree-granting division makes the work of the University ilable to five types of applicants, in accordance with the following require- nts:

1. The student registered for a program leading toward a degree at another itution is admitted to the extent that facilities permit. No transcript of ord is required unless the student has been subject to academic or disci- ary action. The student must be in good standing and eligible to continue the institution last attended during the past academic year.*
2. The student over 21 years of age who is not working for a degree in this another institution may be admitted to take courses for which he has ade- te preparation, as determined by the department concerned. A transcript of ord is not usually required. However, the student must be able to affirm t he is in good standing and eligible to continue in the institution last nded during the past academic year.*
3. Applicants under 21 years of age who have graduated from high school thin the previous two years and who have not attended a college or higher itution may be admitted if they meet the entrance requirements of Co- mbian College of Arts and Sciences (see pages 26–27).
4. Under special conditions, recent secondary school graduates under 21 rs of age who have been accepted by a regionally accredited university or lege for the fall semester of 1975 may be admitted for the *summer session*) without filing a transcript if they submit a photostatic copy of their letter unconditional acceptance.
5. Secondary school students applying for admission to the Secondary School nors Program may be admitted in accordance with the requirements stated page 45.

---

*A student is eligible for admission if he has been suspended within the past academic year.

THE STUDENT SEEKING A DEGREE

An applicant from a secondary school must

1. Send to his high school principal the high school record form provided by the University, with the request that the completed form be mailed *to the Office of Admissions.*

2. Request that a report of College Entrance Examination Board test scores be sent to the Office of Admissions directly from the Educational Testing Service, Princeton, N.J., or Berkeley, Calif. Every applicant is required to submit scores on the Scholastic Aptitude Test and the English Composition Achievement Test. In addition, an Engineering applicant must take the Mathematics Test (Level I or II).

The College Entrance Examination Board tests are preferred; however, the American College Testing battery scores will be accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, Iowa City, Iowa. It is recommended that the applicant take the tests in October of the senior year.

An applicant who has attended one or more institutions of higher learning must request each registrar to mail to the Office of Admissions a transcript of his record, even though credits were not earned. An honorable dismissal is required from the institution last attended.

The report of the Graduate Record Examination, the Miller Analogies Test, or the Admission Test for Graduate Study in Business, where applicable, should accompany application to graduate degree candidacy.

Registration

A STUDENT MAY NOT REGISTER FOR CLASSES until admission to the University has been approved by the appropriate office.

A student previously registered in this University who was not registered for campus courses during the spring semester preceding this registration must apply for and receive a letter of readmission from the Office of Admissions (undergraduate and nondegree) or appropriate Dean's Office (graduate), before he is eligible for registration.

Registration days and hours are stated in the calendar at the front of this catalogue. All students registering on June 2 and July 10 should report first to the first floor of Building K, 817 23rd Street, N.W., where they will be given materials and detailed information concerning registration procedures. On all other registration dates (Law excluded), packets will be distributed from the Office of the Registrar, Rice Hall, 2121 Eye Street, N.W.

Degree candidates in Law secure their registration packets and instructions at the Office of the Dean of the National Law Center, Stockton Hall, 720 Twentieth Street, N.W.

Students planning to take courses in the first session and also in other sessions later in the summer may register at the first registration for *all* summer courses. Students who wish to register for the second five-week session, the second session in Law, or any other session may register on the stated registration dates for those sessions or on any earlier summer registration date (see Summer

sions Calendar, pages 5–6). Tuition for all courses is due and payable in
at the time of registration.
Students expecting to complete requirements for degrees during the Summer
sions must apply for graduation as a part of registration for the Summer
sions and pay the appropriate fee.
In special instances, with the permission of the instructor, a person who has
en admitted to the University may be registered as an auditor in a class with-
being required to take active part or to pass examinations. No academic
edit will be allowed for such attendance. A student who takes a course as an
ditor may not repeat it for credit.

GISTRATION BY GW STUDENTS FOR CONSORTIUM COURSES

campus degree students interested in taking courses at any of the other in-
tions in the Consortium of Universities of the Washington Metropolitan
a, Inc. (see page 9), should consult the program announcements of the
er institutions. Consortium application forms and instructions are available
m the Registrar after the student has obtained his registration packet.
In order to participate in the Consortium program (1) the graduate student
st obtain the approval of his adviser and should ascertain from the depart-
nt of the institution where the course is taught whether or not he is eligible
the course and whether there is space in the class, or (2) the undergraduate
dent must obtain the approval of his adviser and *must* ascertain from the
partment of the institution where the course is taught whether or not he is
ible for the course and whether there is space in the class. Specific in-
ries should be addressed to the Registrar.

ANGES IN PROGRAM OF STUDY

anges in programs of study may be made only with the permission of the
iser or major professor and the dean or director of the college, school, or
sion concerned.
Students should consult the deans' offices concerning final dates on which
anges in schedule may be made.

Fees and Financial Regulations*

E FOLLOWING FEES have been adopted for the summer of 1975:

tion Fees

each semester hour for students in colleges, schools, and divisions
ther than in the School of Engineering and Applied Science† $94.00
each semester hour for students in the School of Engineering and Ap-
ed Science† 96.00

For information on fees and financial regulations for law courses and programs, contact the
e of the Dean, the National Law Center.
Candidates for Master's degrees in the School of Engineering and Applied Science and candidates
Doctoral degrees who were in residence in the University prior to the 1967 Summer Sessions
complete their programs under the schedule for payment of tuition fees in effect prior to
, 1967.

University Center Fee (charged all students registered on campus*, nonrefundable)
For each semester hour for which the student registers $4.3

Additional Course Fees

In certain courses additional fees, such as laboratory and material fees, are charged as indicated in the course descriptions. These fees are due with the tuition fee for the course. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee, the individual student will be required to pay such additional charges as are determined by the department concerned.

Graduation Fees

Associate in Arts 10.0
Bachelor's, Master's, Education Specialist, and Doctor's degrees 25.0
Post-Master's Graduate Certificate in Health Care Administration 25.0
Fee for Binding Master's Thesis 10.0
Fee for Microfilm Service and Printing Announcement of Final Examination (Doctoral candidates) 60.0

Special Fees

Application fee (undergraduate degree candidate) nonrefundable 10.0
Application fee (graduate degree candidate) nonrefundable 25.0
Admission tests (when required) 6.00–12.0
Late-registration fee, for failure to register within the designated period 15.0
Late payment fee, charged for failure to make payments when due (see "Payment of Fees," below) 15.0
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," below) 35.0
Returned check fee, charged a student whose check is improperly drafted, incomplete, returned by the bank for insufficient funds or for any other reason 15.0
For each examination to qualify for advanced standing and for each special examination 5.0
Special Columbian College departmental examination for each course to qualify for receiving credit (advanced standing), waiver of requirement, *or both* 25.0
5.0
English test for foreign students (when required) 3.0
Laboratory check-out fee, for failure to check out of chemistry laboratory by the date set by the instructor† 2.0
National Teacher Examinations fee, for Bachelor of Arts in Education degree candidates 9.00–13.0
Transcript fee, for each transcript of record 2.0
Replacement of lost or stolen picture identification card 2.0

Registration on campus in the University entitles each student to the follow
ing University privileges: (1) the services of the Student Career Services Office
(2) the use of the University Library; and (3) medical attention as describe
under "Student Health Service" (see page 22). These privileges terminat
when the student withdraws or is dismissed from the University.

---

* The maximum charge for any student during the entire Summer Sessions will be $46.50. Student
in the College of General Studies are charged the University Center Fee only when registered fo
courses on campus.

† A student who drops a Chemistry course before the end of the session must check out of th
laboratory at the next laboratory period.

TMENT OF FEES

student is permitted to complete registration or to attend classes until fees are paid. Fees for each session are due in advance at the time of stration. Checks and postal money orders should be made payable to orge Washington University, with student identification number shown in per left-hand corner.

Students who fail to make any payment when due will be automatically arged a $15 late-payment fee and will be subject to the interest charge of 8 cent per annum. Accounts which become 30 days past due will be financially encumbered. In the event a student's account is financially encumbered, student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to hold grades, future registration privileges, transcripts, diplomas, and other demic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

HDRAWALS AND REFUNDS

drawal from a course or from the University requires the permission of dean of the college, school, or division in which the student is registered. lication must be made in person or in writing. Notification to an instructor ot an acceptable notice: all charges for courses dropped without the approval of the dean must be met by the student.

thorization to withdraw and certification for work done will not be given student who does not have a clear financial record.

authorized withdrawals and changes in schedule, cancellation of tuition gees and course fees will be made in accordance with the following dule:

Session	*Per cent refund on or before the date listed*			
	90%	75%	50%	None
week Session (June 2–July 9)	June 5	June 10	June 16	after June 16
week Session (July 10–Aug. 15)	July 15	July 18	July 24	after July 24
week Education Workshop 16–July 3)	June 17	June 19	June 23	after June 23
week Education Workshop 7–July 25)	July 8	July 10	July 14	after July 14
week Education Workshop 28–Aug. 15)	July 29	July 31	Aug. 4	after Aug. 4
k Courses (June 16–July 25)	June 18	June 23	June 27	after June 27
k Courses (June 2–July 21)	June 6	June 11	June 17	after June 17

Session	Per cent refund on or before the date listed 90%	75%	50%	None
8-week Courses (June 2–July 25)	June 6	June 11	June 17	after June 1
9-week Courses (June 16–Aug. 15)	June 19	June 24	June 30	after June 3
Law 13-week Session (May 27–Aug. 20)	June 3	June 17	July 1	after July
Law 1st 6-week Session (May 27–July 7)	May 30	June 4	June 10	after June 1
Law 2nd 6-week Session (July 11–Aug. 20)	July 16	July 21	July 25	after July 2

In no case will tuition be reduced or refunded because of absence from classes.

Payment applies only to the session for which a registration charge is incurred and will not be credited to another session or term.

Students withdrawing from courses scheduled at times other than those included in the list on this and the preceding page should consult the Student Accounts Office for information concerning refunds.

University Regulations

STUDENTS IN THE SUMMER SESSIONS are subject to the same regulations governing students enrolled in a college, school, or division of the University during the academic year. Degree candidates are referred to the catalogues of the schools in which they are registered. Nondegree students should consult the *Undergraduate and Graduate Catalogue*.

Academic Credit.—The Summer Sessions are an integral part of the University. Academic credit for completed work will be given toward the appropriate degrees in the various colleges and schools of the University in accordance with their separate regulations and requirements.

Residence.—Summer Sessions work may be counted in residence but the candidate for a degree must satisfy the residence requirements of the school or college concerned.

Academic Work Load.—No full-time student may take more than 7 semester hours of work during each 5-week session. No student employed more than 20 hours a week may take more than 4 semester hours of work during each 5-week session.

In the School of Education 3 semester hours constitutes a full-time program for full-time students in any one of the 3-week workshop sessions, and 6 semester hours represents full-time work in the 6-week session.

In the National Law Center the maximum amount of work that may be ken in each session by a full-time student is 6 semester hours; by an em-oyed student, 4 semester hours.

In the School of Engineering and Applied Science the maximum amount of ork that may be taken in a session by a full-time student is 6 semester hours.

---

e right is reserved by the University to dismiss or exclude any student from University, or from any class or classes, whenever, in the interest of the dent or the University, the University Administration deems it advisable to so.

The right is reserved by the University to make changes in programs without tice whenever circumstances warrant such changes.

The University and its various colleges, schools, and divisions reserve the ht to modify or change requirements, rules, and fees. Such regulations shall into force whenever the proper authorities may determine.

The University is not responsible for the loss of personal property in any iversity building. A "Lost and Found" office is maintained on campus in e Safety and Security Office, Woodhull House, 2033 G Street, N.W.

IVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

eneral, the policy of the University is one of attempting to keep the stu-t's record confidential and out of the hands of those who would use it for er than legitimate reasons. At the same time, the policy must be flexible ough not to hinder the student, the University, or the community in their timate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; es of attendance; verification of date and place of birth; degrees earned (if), date, major field or area of concentration, and honors received; home local addresses and telephone numbers; school, college, or division of ollment, and class; verification of signature; name and address of parent or rdian.

2. The issuance of formal transcripts of record to recognized institutions of her learning; the certification of academic achievement to the various recog-ed professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from student, or by court order or subpoena.

Government investigative agencies have no inherent right of access to stu-t files and records. If expressly requested, properly identified representa-s from federal, state, or local government agencies may be given the infor-ion listed under No. 1 above.

ENTLY ESTABLISHED REGULATIONS

Appendix (pages 114–16) contains regulations recently approved by the versity's Board of Trustees.

Student Services and Activities

STUDENT HEALTH SERVICE

THE STUDENT HEALTH SERVICE is an outpatient clinic designed to assist students registered on campus with their health needs. This Service is located at 935 22nd Street, N.W. (in the H.B. Burns Memorial Building).

Physicians are available by appointment from 9 a.m. to 4:45 p.m., Monday through Friday. In addition, physicians are available to walk-in patients from 6 p.m. to 9 p.m. during the Summer Sessions, Monday through Friday, and from 9 a.m. to 12 noon on Saturday.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. This arrangement is for emergency care only, and all fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. A student who is not currently enrolled or who has severed his connection with the University is ineligible for medical benefits of the Student Health Service.

Any student may engage, if he so desires, physicians and nurses of his own choice, but he will be responsible for all the fees charged. The bills incurred from all services rendered outside of the Student Health Service (for example, X-ray work and referrals to specialists or other outside physicians) are the responsibility of the student. Within the Student Health Service, there will be only a few small charges for some services, such as materials for an allergy injection series, overseas immunizations, and certain other services.

Any student who intends to train for an athletic team is required to pass a thorough medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Human Kinetics and Leisure Studies.

THE READING CENTER

The Reading Center offers individual diagnostic and corrective services for all levels: primary, elementary, secondary, and adult. In addition, special reading improvement classes are conducted for high school and college students as well as other adults.

A complete diagnosis includes psychological tests; vision, hearing, dominance, and spelling tests; and various types of reading achievement and aptitude tests. Results are interpreted, and a written report is presented in conference with the parents or the individual.

The special reading improvement classes for high school students, college students, and other adults are offered throughout the year at stated intervals. Emphasis is placed on improvement of vocabulary, speed, comprehension, and study skills. Instruction in spelling is also provided as needed. Mechanical aids such as the tachistoscope, rate accelerator, and controlled reader are available for increasing speed of comprehension.

Fees.—The fee for individual diagnosis is $90; for individual instruction, $10 a lesson; for semi-individual instruction, $7 a lesson; for instruction in small

roups, secondary level, $6 a lesson. Reading classes (15 two-hour sessions) are fered for adults, $140; for full-time George Washington University students d alumni, $65. Full-time employees may contact the Center regarding special es. All fees are payable in advance at the Office of the Cashier.

OUNSELING CENTER

he Counseling Center works to enable the campus community to maximally rofit from instruction by helping students overcome obstacles, anxieties, and nfusions which hamper learning. Services are offered in three areas: (1) solution of the individual's educational, vocational, personal, or social prob- ms through short-term individual or group counseling/psychotherapy, voca- nal testing, or study skills remediation; (2) training graduate students, resi- nt assistants, and paraprofessionals, as well as consulting on mental health pics; and (3) developing innovative methods to aid student growth, such as diotaped information on undergraduate majors, counseling and therapy rough written communication, and videotaped counselor skills training.

The Center also administers the Miller Analogies Test, Admissions Testing, d special assessments for business and industry.

Fees.—Students may request a cost-free interview between 9 a.m. and 4:30 m., Monday through Friday (except Friday mornings). If the student decides continue the services offered, a minimum fee of $30 will be charged for ort-term treatment. However, if financial need is a factor, fee adjustments n be made.

The Counseling Center is located at 718 Twenty-first Street, N.W.

E SPEECH AND HEARING CLINIC

he Speech and Hearing Clinic offers diagnostic and remedial work for children d adults with such communication difficulties as stuttering, lisping, cleft palate eech, and cerebral-palsied speech; and with voice, articulatory, and hearing roblems. Diagnostic and remedial work is also available for persons with nstandard language usage due to such conditions as hearing loss, brain mage, mental retardation, and environmental factors.

Fees.—The fee for an initial evaluation is $30. Fees for additional special- d testing are dependent on the testing involved. The fees for individual eech or hearing therapy range from $3.75 to $15 a session. Fees are reduced r full-time students enrolled in the University and for persons receiving oup therapy. Fees are payable at the Office of the Cashier.

TERANS EDUCATION

e Office of the Registrar, Luther Rice Hall, 2121 Eye Street, N.W., assists dents entitled to educational benefits as veterans, widows, or war orphans n any problems which may arise concerning their benefits. This Office also ocesses certification of enrollment and attendance to the Veterans Administra- n so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should sult the Office of the Registrar prior to submitting application to the Vet- ns Administration. All such students should obtain the instruction sheet ed by the Office of the Registrar, which sets forth requirements to be ful- d before certification of enrollment can be made to the Veterans Adminis- tion, and which includes other information of general interest.

The on-campus VA benefits counseling office is located in Rice Hall, 5th floor, and is open 8:30 a.m. to 5 p.m. The Veterans Administration is located at 2033 M Street, N.W., Washington, D.C. 20421.

RESIDENCE HALL

Men, women, and married couples (no children) will be housed in Thurston Residence Hall, 1900 F Street, N.W. This is a modern, air-conditioned building.

Admission to the University does not include a room reservation. A separate application for accommodations at Thurston should be made well in advance. Single occupancy rooms are provided only as they may be available in accordance with overall demands for space in the hall. As a general rule, summer session students are expected to share and will be assigned to multiple occupancy rooms accommodating two or three students.

RESIDENCE HALL RATES FOR 1975 SUMMER SESSIONS*

	Multiple Occupancy	*Single Occupancy*
Weekly	$ 35.00	$ 45.00
Daily	8.00	10.00
Each regular 5-week Session	175.00	225.00

Residence hall payments are due and payable in advance. A student who fails to meet payment is subject to automatic suspension.

Forms for application, together with detailed information, may be obtained from the Director of Housing.

Information concerning off-campus housing near the University is available at the Office of the Director of Housing.

CLOYD HECK MARVIN CENTER

The Cloyd Heck Marvin Center serves as the campus community center, providing services, conveniences, and recreational and social opportunities for students, faculty, staff, alumni, and guests. Its wide range of facilities provides the setting for a variety of programs conducted by the University Program Board; the departments of Drama, Dance, and Music; and other student and faculty organizations.

The Center Governing Board, representative of all elements of the University community, plays an important role in the day-to-day functioning of the Center. This Board works closely with the full-time staff in the development of procedures and policies which provide a framework for the Center's operation.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

The Student and Alumni Career Services Office provides assistance to G.W.U. students and alumni seeking full-time, part-time, temporary, or permanent employment. All students are urged to become acquainted with the services of this Office early in their college experience.

* The rates include linen service. Rates shown are subject to change.

Counseling concerning trends in employment, areas of employment, various
st and examination announcements, preparation for job interviews, résumé-
riting, and other procedures for successful job application are always avail-
le. Specific career openings; an on-campus recruitment program by business,
dustry, government, and school systems; volunteer opportunities; and part-
ne and temporary jobs for students while attending school are all part of this
rvice. Referral and placement functions of the on-campus College Work-
udy Program are handled by the Student and Alumni Career Services Office.
acher credential files initiated by persons seeking employment in all educa-
nal fields are maintained in this Office. Reference files for students applying
law schools, medical schools, or other graduate schools are maintained.
An understanding and knowledgeable approach to avenues of service for
se people who do not find career satisfaction in the structured systems of
siness, government, and education is also provided in the Student and Alumni
reer Services Office.

CIAL AND RECREATIONAL PROGRAM

e social and recreational program includes many varied activities and sched-
d events. In addition to this campus program a great abundance of cultural
well as social and recreational opportunities is available to persons living in
metropolitan area. During the summer the University posts a weekly guide
these events on a bulletin board in the Cloyd Heck Marvin Center.

THE COLLEGES, SCHOOLS, AND DIVISIONS

INFORMATION CONCERNING SPECIFIC REQUIREMENTS for degrees is omitted from this catalogue. For such information and other pertinent regulations, the student is referred to the catalogue of the school concerned.

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

Since its founding in 1821, Columbian College has been the liberal arts unit of the University, offering baccalaureate degrees in all the traditional areas of the arts and sciences. Under a new academic plan, students have wide options in developing their academic programs, in earning advanced standing by examination, in devising interdepartmental majors, and, if qualified, in working toward a new three-year program leading to the regular degrees. Students are encouraged to select their major field as soon as possible, hopefully no later than the end of their freshman year. From that time, they receive their academic advice and guidance from the chosen major-field department. In addition to fulfilling major-field requirements, students are expected to broaden their cultural foundations in the Humanities, the Social Studies, and the Natural and the Mathematical Sciences. The College also provides prelegal and premedical programs and also the preprofessional work required for admission to the School of Education and to the School of Public and International Affairs.

THE DEGREES

Columbian College offers work leading to the following degrees: Associate in Arts, Bachelor of Arts, and Bachelor of Science. In cooperation with the School of Medicine and Health Sciences, Columbian College offers work leading to the combined degrees of Bachelor of Arts and Doctor of Medicine. Columbian College grants the following degrees to students in off-campus programs administered by the College of General Studies: Associate in Arts in General Studies, Bachelor of General Studies, Bachelor of Science in Geodetic and Cartographic Science, and Bachelor of Science in Oceanography.

ENTRANCE REQUIREMENTS

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least 15 units* which must include four years of English

* A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

t least two years of one foreign language; two years of science, preferably with aboratory instruction; two years of social studies, one of which must be Amer- an history; and two years of college preparatory mathematics.

2. The principal's statement that the applicant is prepared to undertake col- ge work.

3. College Entrance Examination Board scores, which must be submitted on e Scholastic Aptitude Test and the English Composition Achievement Test*

A person who does not present all of the formal requirements stated above ay request the Office of Admissions to present his case to the Columbian Col- ge Committee on Admission and Advanced Standing. The Committee may escribe appropriate tests.

The applicant is responsible for

Sending the report form obtained from the Office of Admissions to his high school principal who will complete the form and forward it directly to the Office of Admissions.

Requesting a report of scores on the Scholastic Aptitude Test and the English Composition Achievement Test to be sent to the Office of Admissions by the Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540, or 1947 Center Street, Berkeley, Calif. 94704.

AJOR FIELDS

rricula leading to the degree of Bachelor of Arts are available in the follow- major fields:

erican Civilization
erican Literature
hropology
lied Mathematics
lied Statistics
History
logy
omy
emistry
ese Language and Literature
sical Archaeology and
thropology, studies in
sical Archaeology and Classics,
dies in
sical Humanities
matic Art
omics
sh Literature
ronmental Studies
Arts
h Language and Literature
graphy
logy
manic Languages and Literatures
ory

Journalism
Judaic Studies
Latin
Latin American Studies
Mathematical Statistics
Mathematics
Music:
  Applied Music
  Music History and Literature
  Music Theory
Philosophy
Physics
Political Science
Psychology
Religion
Russian Language and Literature
Russian Literature and Culture—in Translation
Sociology
Spanish American Literature
Spanish Language and Literature
Speech Communication
Speech Pathology and Audiology
Zoology

ge 16 for American College Testing Program.

Curricula leading to the degree of Bachelor of Science are available in the following major fields:

Applied Mathematics
Applied Statistics
Biology
Botany
Chemistry
Environmental Studies
Geology
Mathematical Statistics
Mathematics
Physics
Zoology

THE GRADUATE SCHOOL OF ARTS AND SCIENCES

The Graduate School offers work leading to the following degrees: Master of Arts, Master of Arts in Special Studies, Master of Fine Arts, Master of Forensic Sciences, Master of Music, Master of Science, Master of Science for Teachers, Master of Science in Forensic Science, Master of Science in Special Studies, and Doctor of Philosophy. In cooperation with the School of Medicine and Health Sciences, the Graduate School offers work leading to the combined degrees of Master of Science and Doctor of Medicine or Doctor of Philosophy and Doctor of Medicine. The degrees of Master of Arts in Special Studies and Master of Science in Special Studies, which are also available in off-campus programs, are designed for students who do not wish to concentrate in a specific field such as those listed below under "Graduate Fields," but instead are interested in interdisciplinary programs. It is possible to group several of these fields together to make an interdisciplinary program; the program of studies is determined by the student in consultation with the Dean of the Graduate School. Courses in off-campus programs leading to these degrees are administered by the College of General Studies.

ENTRANCE REQUIREMENTS

The entering graduate student must have an approved Bachelor's degree from an accredited higher institution, an appropriate distribution of courses, and a superior quality of work in the major field. Entering graduate students working toward the degree of Master of Science for Teachers must also have experience in teaching mathematics at the secondary school level.

GRADUATE FIELDS

Subject	Degrees Offered
I. Humanities	
American Civilization	M.A. Ph.D.
American Literature	M.A. Ph.D.
Art:	M.F.A.
Ceramics	
Design	
Graphics	
Painting	
Photography	
Sculpture	
Art History	M.A. Ph.D.

Subject	Degrees Offered	
Art Therapy	M.A.	
Classical Archaeology, Classics, and History	M.A.	
Dramatic Art	M.F.A.	
English Literature	M.A.	Ph.D.
*French Literature	M.A.	Ph.D.
Germanic Languages and Literatures	M.A.	
Music:	Mus.M.	
Applied Music		
Conducting		
Music Composition		
Music Theory		
Musicology	M.A.	
Philosophy	M.A.	
Religion	M.A.	
Religion and Medical Care	M.A.	
Religious Education	M.A.	
Russian Language and Literature	M.A.	
*Spanish American Literature	M.A.	Ph.D.
*Spanish Literature	M.A.	Ph.D.
Social Sciences		
Anthropology	M.A.	
Economics	M.A.	Ph.D.
Education Policy		Ph.D.
Forensic Sciences	M.Forens.S.	
Geography	M.A.	
History	M.A.	Ph.D.
†International Relations		Ph.D.
Political Science	M.A.	Ph.D.
Sociology	M.A.	Ph.D.
Physical and Mathematical Sciences		
Applied Mathematics	M.A., M.S.	
Applied Statistics	M.S.	
Chemistry	M.S.	Ph.D.
Forensic Sciences	M.S. in Forens.S.	
Geochemistry	M.S.	Ph.D.
Geology	M.A., M.S.	Ph.D.
Mathematical Statistics	M.A.	Ph.D.
Mathematics	M.A.	Ph.D.
Physics	M.A.	Ph.D.
Biomedical and Related Sciences		
Anatomical Pathology	M.S.	
Anatomy		Ph.D.
Biochemistry	M.S.	Ph.D.

*approved combination of French, Spanish, or Spanish American Literature is available as a of Philosophy field.

†School of Public and International Affairs offers a Master of Arts field in International

Subject	Degrees Offered
*Biological Sciences	M.S. Ph.D
Genetics	M.S. Ph.D
Human Ecology	Ph.D
Microbiology	M.S. Ph.D
Mycology	M.S.
Pathology	Ph.D
Pharmacology	M.S. Ph.D
Physiology	M.A. Ph.D
Psychology	M.A. Ph.D
Speech Pathology and Audiology	M.A.

THE SCHOOL OF MEDICINE AND HEALTH SCIENCES

The School of Medicine and Health Sciences offers work leading to the degree of Associate in Science with areas of concentration in Medical Laboratory Technique, Medical Service Technology, Nuclear Medicine Technology, and Radiologic Technology; Bachelor of Science in the fields of Environmental Health, Medical Technology, and Radiologic Sciences and Administration, with designation as Physician's Assistant, Nurse Anesthetist, and Nurse Practitioner; and Doctor of Medicine.

Students may enter the Doctor of Medicine program and most programs leading to the degrees of Associate in Science and Bachelor of Science only in the fall semester. For detailed information concerning admission procedures and course offerings, request the *School of Medicine and Health Sciences* catalogue.

THE NATIONAL LAW CENTER

The National Law Center offers work leading to the degrees of Juris Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (American Practice), and Doctor of Juridical Science.

Forms for application for admission and information concerning course offerings may be obtained from the Office of the Dean of the National Law Center, 720 Twentieth Street, N.W., Washington, D.C. 20052.

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: Civil Engineering (with Computer-oriented Civil Engineering and Environmental Civil Engineering options), Electrical Engineering (with Computer Science option), and Mechanical Engineering (with Computer-oriented Mechanical Engineering and Energy Resources and Power options); graduate programs lead to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science. The School also grants the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science to students in off-campus programs administered by the College of General Studies.

* Biology, Botany, and Zoology.

TRANCE REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE

e School admits those applicants who can benefit themselves and society by
plined intellectual effort in its environment.
Admission is the first selective step in a long series of qualifying steps the
dent will take in his progress toward professional competence in engineering.
ndicates the School's belief that the applicant has at least the minimum
paration and ability to complete the curriculum successfully.
The applicant must be of good character and must have an academic back-
und appropriate for the program of studies contemplated.
Consideration for admission is based on the following:
. An acceptable certificate of graduation from an accredited high school
ving at least 15 units*;
. The principal's statement that the applicant is prepared to undertake col-
work;
. Scores on the following College Entrance Examination Board tests: the
lastic Aptitude Test, and the English Composition Achievement Test.
e qualifications of applicants who, because of unusual circumstances, do
meet the above requirements will be considered by the School, which may
cribe admission tests.
ne and one-half of the 15 units required for entrance must be distribu-
as follows: three in English, two in algebra, one in plane geometry, one-half
lane trigonometry, one in physics or chemistry, and two in one foreign
age or history. General science may not be counted in satisfaction of the
ce requirement but may be counted as an elective unit.
is recommended that *both* physics and chemistry be studied in high school.
gh school course in solid geometry is recommended as a firm foundation
college mathematics.
n applicant must arrange to have sent directly *from his school to the Office
dmissions of the University* the academic record of his first seven terms in
ndary school, together with a personal evaluation and recommendation
his principal. This information may be supplied on a form provided by
University or on a standard form used by the secondary school provided
sential information is included.
antitative Deficiency.—A graduate of an approved high school who lacks
more than two units of the required subjects and who presents 15 accept-
units may be admitted to a prescribed program which includes courses to
up his deficiencies.

ANCE REQUIREMENTS FOR THE MASTER'S DEGREES

ssion to graduate study toward a Master's degree requires an appropriate
elor's degree from a recognized institution and evidence of capacity for
ective work in the field selected, as indicated by undergraduate grades,
uate Record Examination scores, and similar data.
applicant who has significant deficiencies in preparation may be required
e prescribed undergraduate courses as an unclassified student before being
ted to graduate student status. In some cases, if such deficiencies are

* represents a year's study in a secondary school subject, including in the aggregate not
120 sixty-minute periods of prepared classroom work.

minimal, he may be admitted to graduate student status and allowed to take a limited number of graduate courses while completing the undergraduate course in which he is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the Master's degree.

ENTRANCE REQUIREMENTS FOR THE DOCTOR'S DEGREE

A satisfactory Master's degree from an accredited institution is required, together with acceptable personal qualities and a capacity for creative scholarship. Normally, a *B* average in graduate work is required. However, the minimum does not assure automatic acceptance; the departments may, and often do, set higher admission standards. The prospective doctoral student seeking admission should apply before June 1 for the fall semester and before December 1 for the spring semester. Personal interviews may then be arranged to discuss the applicant's qualifications and the possibilities for an effective doctoral program. The applicant must arrange for complete documentary records (transcripts) to be forwarded to the Manager of Engineering Admissions in sufficient time to permit assembly of complete records for evaluation as soon after the above application deadlines as possible.

The applicant must arrange for letters of recommendation to be submitted from two faculty members of the institution from which he received his Master's degree; one of these, if possible, should be from his Master's adviser. The letters should be addressed to the appropriate department chairman.

THE SCHOOL OF EDUCATION

The School of Education offers initial preparation in teaching, counseling, supervision, and administration as well as opportunities for experienced educators to extend their training. The schedule of courses is arranged to meet the needs of employed students as well as those able to devote full time to their studies. Students pursuing programs involving teacher certification must make arrangements to student-teach in the fall or spring semester during hours when public schools are in session. The School offers both graduate and undergraduate work.

THE DEGREES

The School of Education offers work leading to the following degrees: Bachelor of Arts in Education, Bachelor of Science in Human Kinetics and Leisure Studies, Master of Arts in Teaching, Master of Arts in Education, Education Specialist, and Doctor of Education. The School also grants the degree of Master of Arts in Education to students in the off-campus programs administered by the College of General Studies.

ENTRANCE REQUIREMENTS

For the Bachelor's Degrees.—The satisfactory completion of two years of approved college work, or graduation from an approved two-year college, or the equivalent, is required.

For the degree of Master of Arts in Education.—A Bachelor's degree from an accredited institution, an undergraduate quality-point index of 2.50 or above

average), demonstrated interest in teaching, and personality traits that promise of success as a teacher, are required. In a number of programs are more applicants than can be accepted; therefore, selections by additional criteria are necessary. Two years of successful teaching are required before admission to candidacy in the fields of guidance and school administration. perience is required for admission to programs in adult education and human source development.

For the Degree of Master of Arts in Teaching.—To be admitted to the program in museum education, an applicant must (1) have a Bachelor's degree from an accredited liberal arts institution; (2) submit three written references testing to quality of academic record and work experience; and (3) be interviewed by the University Selection Committee, or under arrangements specified by the Committee and approved by the Dean of the School of Education. For the program in museum education, skills in communication, a desire to study and learn from the artifacts of nature and civilization, and an ability for and interest in working with people are essential; evidence of strong undergraduate, graduate, or professional experience in such fields as American history, geology, art, or the social sciences will be considered favorably.

For the Degree of Education Specialist.—The degree of Master of Arts in education from this University, or the equivalent; a satisfactory score on the Miller Analogies Test or the Graduate Record Examination; and two years of successful pertinent experience are required. Each applicant must be interviewed and recommended by a staff member of the School of Education or by representative in the candidate's locality appointed by the Dean.

For the Degree of Doctor of Education.—The applicant must have adequate preparation for advanced study, including graduate work in fields prerequisite to his objective equivalent to that required for the degree of Master of Arts in education at this University, at least three years of successful pertinent educational experience, acceptable personal qualities, and capacity for creative scholarship and effective leadership.

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

The School of Government and Business Administration offers work leading to the following degrees: (1) Bachelor of Business Administration with a major in Accounting or Business Administration; (2) Master of Arts in Government in the fields of International Management, Manpower Management, Metropolitan Administration and Planning, Public Administration, Public Financial Management, and Public Personnel Management; (3) Master of Arts in Health Care Administration; (4) Master of Business Administration with fields of concentration in Accounting, Administration of Science and Technology, Behavioral Science in Organization Development, Business-Government Relations, Finance and Investments, Health Care Administration, Information Systems Technology, International Business, Managerial Economics, Marketing, Operations Research and Systems Analysis, Personnel Management, Procurement and Contracting, and Transportation; (5) Master of Public Administration; (6) Master of Urban and Regional Planning; (7) Post-Master's Graduate Certificate in Health Care

Administration; (8) Doctor of Business Administration; and (9) Doctor of Public Administration. The School also grants the degrees of Bachelor of Science in Administration and Master of Science in Administration to students in off-campus programs administered by the College of General Studies.

ENTRANCE REQUIREMENTS FOR THE BACHELOR'S DEGREE

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least 15 units which must include four years of English, at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and two years of college preparatory mathematics.
2. The principal's statement that the applicant is prepared to undertake college work.
3. College Entrance Examination Board scores, which must be submitted on the Scholastic Aptitude Test and the English Composition Achievement Test.*

A person who does not present all of the formal requirements stated above may request the Office of Admissions to present his case to the School of Government and Business Administration. The School may prescribe appropriate tests.

The applicant is responsible for

a. Sending the report form obtained from the Office of Admissions to his high school principal who will complete the form and forward it directly to the Office of Admissions.
b. Requesting a report of scores on the Scholastic Aptitude Test and the English Composition Achievement Test to be sent to the Office of Admissions by the Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540 or 1947 Center Street, Berkeley, Calif. 94704.

ENTRANCE REQUIREMENTS FOR THE MASTER'S DEGREES

A Bachelor's degree from an accredited college or university that includes at least 90 semester hours of academic work, with a quality-point index of 3.0 (a *B* average) in the relevant undergraduate field, is required.

Applicants for admission to programs leading to the degree of Master of Business Administration must submit acceptable scores on the Admission Test for Graduate Study in Business; applicants for admission to programs leading to the degrees of Master of Arts in Government,† Master of Arts in Health Care Administration,† Master of Public Administration,† and Master of Urban and Regional Planning must submit scores on the Admission Test for Graduate Study in Business *or* the Graduate Record Examination. It is the responsibility of the applicant to make arrangements for the required test with the Educational Testing Service, Princeton, N.J. 08540. Correspondence concerning the Admission Test for Graduate Study in Business should be addressed to Box 966; concerning the Graduate Record Examination, to Box 955.

---

* See page 16 for American College Testing Program.

† Scores on the Miller Analogies Test are accepted in place of the Admission Test for Graduate Study in Business or the Graduate Record Examination for admission to the programs of study leading to the degrees of Master of Arts in Government, Master of Arts in Health Care Administration, or Master of Public Administration. The Miller Analogies Test is offered through the auspices of universities nationally.

TRANCE REQUIREMENTS FOR THE DOCTOR'S DEGREES

Doctor of Business Administration.—The degree of Master of Business Administration, Master of Arts in an approved field, or the equivalent, together th acceptable personal qualities and a capacity for creative scholarship, is uired. Applicants must file results of the Admission Test for Graduate dy in Business administered by the Educational Testing Service.

Doctor of Public Administration.—The degree of Master of Public Administion, Master of Arts in an approved field, or the equivalent, together with eptable personal qualities and a capacity for creative scholarship, is required. plicants must file results on either the Admission Test for Graduate Study in siness *or* the Graduate Record Examination administered by the Educational ning Service.

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

e School of Public and International Affairs offers work leading to the deees of Bachelor of Arts with a major in Chinese Language and Literature, Asian Studies (China and Japan), International Affairs, Public Affairs, or an Affairs; Master of Arts in the fields of International Affairs, Latin erican Studies, Public Affairs, Russian Studies, and Science, Technology, Public Policy.

TRANCE REQUIREMENTS FOR THE BACHELOR OF ARTS DEGREE

With a major in Chinese Language and Literature, East Asian Studies (China Japan), International Affairs, Public Affairs, or Urban Affairs.—The satisory completion of the appropriate curriculum for the freshman and sophoe years in Columbian College of Arts and Sciences, or the equivalent, is ired.

RANCE REQUIREMENTS FOR THE MASTER OF ARTS DEGREE

Bachelor's degree from an accredited college or university is required. Stus admitted to candidacy should have attained a *B* average or equivalent in relevant undergraduate fields.

the field of International Affairs.—The applicant's undergraduate program ld include background courses corresponding to an undergraduate major ternational affairs at this University.

the field of Latin American Studies.—An undergraduate major in Latin erican Studies is normally required. Majors in other fields may be conod provided their undergraduate course work includes Spanish or Portue and sufficient course work in three of the following areas: Anthropology, nomics, Geography and Regional Science, Hispanic Literature, History, and ical Science.

the field of Public Affairs.—An undergraduate major in public affairs, omics, history, or political science, depending on the field of specialization, uired.

the field of Russian Studies.—The applicant's undergraduate program d include appropriate background courses in history, political science, and ian language.

the field of Science, Technology, and Public Policy.—No particular

undergraduate concentration is required. The desirable qualifications are both superior competence in a specific discipline and potential aptitude for cross disciplinary work.

THE COLLEGE OF GENERAL STUDIES

The College of General Studies administers the off-campus degree program over which Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Medicine and Health Sciences, the School of Engineering and Applied Science, the School of Education, and the School of Government and Business Administration have degree-granting authority. The College also offers credit courses in liberal arts, education, and business administration for which there is sufficient demand. Special programs are offered to meet the in-service needs of specified groups. As a community service, a regular program of noncredit courses without entrance requirements is also offered.

ENTRANCE REQUIREMENTS

Off-campus Credit Courses.—A simplified procedure is used for admission and registration in off-campus courses. Transcripts of previous academic work are not required. Registration is restricted to those whose qualifications would indicate that they are able to carry the course successfully. Registration in an off-campus course does not constitute admission to degree candidacy in the University.

Noncredit Courses.—In general, noncredit courses will be open to any individual interested in enrolling. When a noncredit course is organized at the request of some particular agency or group, admission may be restricted to the students recommended by the sponsoring organization. A limit on the size of classes may have to be imposed in order to maintain the quality of instruction.

The separate catalogue of the College of General Studies, available at the College, 706 Twentieth Street, N.W., Washington, D.C. 20052, contains full information concerning programs, courses, entrance and degree requirements, and fees.

THE DIVISION OF UNIVERSITY STUDENTS

The Division of University Students makes the work of the University, in its several colleges and schools, accessible to five types of students who are not working toward a degree in this University (see page 15).

THE DIVISION OF EXPERIMENTAL PROGRAMS

Under the auspices of the Division of Experimental Programs, students, faculty, and administrators throughout the University are involved in the planning, teaching, and evaluating of experimental courses and programs. There are presently two academic programs directly sponsored by the Division, the Program in Experimental Humanities and the Service-Learning Program.

The Program in Experimental Humanities offers courses which provide op

nunities for students to combine sustained field-study with classroom work. ese courses are taught by interdisciplinary and interdivisional faculty teams. he Service-Learning Program integrates supervised work-study with class- n seminars. Students in the Program are assigned to community groups, earch organizations, or governmental agencies.

The Division of Experimental Programs sponsors a special program in cur- ular development, the GW-Washington Project, which is charged with mo- ing academic resources throughout the University that can appropriately ress the needs in the Washington, D.C., communities, particularly the com- nities of poverty.

SPECIAL PROGRAMS AND WORKSHOPS

THE SUMMER SESSIONS is pleased to announce a carefully planned group of spe
cial programs and workshops devised to serve a variety of student needs an
to utilize resources which are uniquely present at the University and in th
nation's capital. These programs, which are described below, have been devel
oped in many areas. They all have a strong academic orientation and will b
taught by the regular faculty of the University or distinguished visitors fro
other institutions.

American Cinema

FIRST SESSION—JUNE 2 TO JULY 9

INVESTIGATION OF THE GROWTH AND DEVELOPMENT of the American cinema i
the subject of a special program to be offered jointly by the American Studie
Program and the Department of Speech and Drama. Films will be studied
from the inception of the film industry in 1896 to the end of the silent era i
1927, in light of the American culture and the industry which produced them

Students will investigate the development of Hollywood as a film colony, th
growth of the giant film studios, censorship in film, and other topics related t
the early film industry. The study of the films themselves will fall into three
categories: (1) directors such as Griffith, Eisenstein, and Von Stroheim; (2)
genres: comedy, western, sex, war, and the foreign film; and (3) the star system
featuring Chaplin, Fairbanks, Sr., Pickford, Chaney, Sr., and Valentino. A
least one classic film will be viewed during each class session.

Additional information may be obtained by writing Howard Gillette, Jr., Di
rector, American Studies Program, George Washington University, Washington
D.C. 20052.

AMERICAN CIVILIZATION OR SPEECH AND DRAMA — Rubin

192–10 **The Classic Silent Film in American Civilization** (3)
MW 6–10 pm.

Capital City Historical Seminar

HIS SEMINAR ON THE HISTORY OF THE NATIONAL CAPITAL, offered jointly by
e American Studies Program and the Department of History, combines the
al features of the overall development of the city and the character of its vari-
s neighborhoods. Looking forward to the bicentennial year, it utilizes Wash-
gton as a laboratory for developing local history skills such as oral history,
ighborhood surveys, perspectives on preservation, and use of local records.
e first semester will focus on the origin and physical growth of the city and
neighborhoods, their demographic features, and the development of their
ututions—economic, religious, educational, cultural, and recreational. A
cond semester, which is optional, will be spent working in conjunction with
ff members of the Smithsonian Institution in preparation of an exhibit on a
pic in Washington history for the bicentennial year.
Letitia Woods Brown, Professor of American History and Civilization, con-
cts the seminar, assisted by guest lecturers who contribute their expertise on
ecial topics. Walking tours, bus rides, use of audio-visual materials—and
dance in development of such materials—are features of the course.
Additional information may be obtained from Howard Gillette, Jr., Director
the American Studies Program, or R.W. Kenny, Chairman, Department of
tory, George Washington University, Washington, D.C. 20052.

ERICAN CIVILIZATION OR HISTORY

225–26 **History of Washington, D.C.** (3–3) — Brown and Staff
First Session: 225–10; Second Session: 226–11. TTh 6:10–8 pm; field trips as arranged.

nce Workshop

2 TO JUNE 20*

PROGRAMS IN DANCE of the Department of Human Kinetics and Leisure
ces are offering a three-week dance workshop under the direction of Sharon
h Clark, Associate Professor of Human Kinetics and Leisure Studies. This
the Summer Dance Workshop will bring three well-known performers to
ampus as Guest Artists in Residence, Kei Takei, Robert Moulton, and
yn Pate.
concert featuring works of students in repertory classes and the Guest
s-in-Residence will be presented in the Marvin Theatre, Thursday, June 19,
30 p.m.
e Workshop is open to both graduate and undergraduate students with pre-
experience in dance and theatre. From 1 to 4 semester hours of credit
be earned, or courses may be audited. Graduate credit in the program
be arranged.
ditional information may be obtained from Sharon Leigh Clark, Coordina-
ance Programs, Building J, George Washington University, Washington,
20052.

*Classes begin June 2. Registration June 2, Building K.

HUMAN KINETICS AND LEISURE STUDIES

118–10 **Special Problems in Dance Composition** (1) Takei, Pate
Work with elements of movement leading to short composition studies. Students encouraged to explore their choreographic ideas. Guidelines and techniques offered to channel abstract thoughts into works performed at end of workshop. MTWThF 11:30 am–1 pm.

118–11 **Special Problems in Dance Composition** (1) Moulton
Choreographic exploration seeking new creative techniques in voice and movement for use in making dances. MTWThF 11:30 am–1 pm.

120–10 **Repertory** (1 or 2) Takei
Students learn an original work(s) from the repertory of Kei Takei to be performed in concert at the end of the workshop. Admission by permission of instructor. May be repeated for credit not to exceed 4 semester hours. MTWThF 2–3:30 pm.

120–11 **Repertory** (1 or 2) Moulton
Creation of two works, one a six-day performance, the other a piece for performance in the June 19th concert. Open to all workshop participants regardless of technical level. May be repeated for credit not to exceed 4 semester hours. MTWThF 2–3:30 pm.

121–10 **Dance Technique I** (1) Takei, Pate
Exercises for relaxing and strengthening the body, and improving the performer's control, enabling a wider movement vocabulary. May be repeated once for credit. MTWThF 9:30–11 am.

121–11 **Dance Technique II** (1) Moulton
Techniques of stage movement and dance performance. Basic movement technique that deals with gravity, space, and rhythm leading from the performer to the audience. MTWThF 9:30–11 am.

Field Program in Pre-Columbian Cultural Ecology

JUNE 2 TO JUNE 30

THE DEPARTMENTS OF ANTHROPOLOGY AND GEOGRAPHY AND REGIONAL SCIENCE at George Washington University are offering an intensive four-week field program in Mexico for the study of Pre-Columbian cultural ecology. The diversity of irrigation system types found in ancient Mesoamerica suggests alternatives to the traditional hypothesis that large-scale canal irrigation is a prerequisite to settled urban life and a state-type political system. The class surveys Pre-Columbian settlement patterns and socio-political structure and their relationships to these agricultural water control systems. Students examine the evidence in the classroom, in the field, and on the sites themselves, and are encouraged to use a systems approach to develop alternative explanations for social integration. Mesoamerican systems are compared with those of the ancient Near East and Europe to aid in understanding the growth and development of contemporary urban centers and their relationships to the environment.

Students are introduced to the techniques of analysis used by scientists to perceive the complex interactions between cultural and environmental systems both the laboratory and the field. Evenings are devoted to a survey of Mesoamerian prehistory and archaeology and seminar discussions of problems in human ography.

In addition to an extended period in the field examining pre- and post-conest irrigation systems of the Mesoamerican area, the class visits the Museum of nthropology in Mexico City and the ancient cities of Teotihuacan, Tula, Cho-, and Monte Alban, and the Yucatan peninsula to view first-hand the widely iant systems of water control and the settlement patterns related to them in ch area. Students live in selected hotel accommodations adjacent to the sites. The course is directed by Robert L. Humphrey, Jr., Associate Professor of nthropology, and Kenneth J. Langran, Assistant Professor of Geography and gional Science. Further information, including cost of travel and tuition, and plication forms may be obtained by writing to Robert L. Humphrey, Jr., airman, Department of Anthropology, or Kenneth J. Langran, Department of eography and Regional Science, George Washington University, Washington, C. 20052.

THROPOLOGY OR GEOGRAPHY AND REGIONAL SCIENCE

215–10 **Field Methods in Cultural Ecology: Pre-Columbian Settlement Patterns in Mesoamerica** (3 or 6) — Humphrey, Langran

Field Research in Historical Archaeology

NE 16 TO AUGUST 22

EORGE WASHINGTON UNIVERSITY's Department of Anthropology and American dies Program, in cooperation with the Smithsonian Institution and the St. y's City Commission, a new historical agency of the State of Maryland, offer truction and field training in historical archaeology. In an intensive 10-week gram students will excavate one of the structures at St. Mary's, a Yoacomico an village which became the 17th century capital of Maryland. Today the is occupied by the campus of St. Mary's College of Maryland and a state oric park. The summer program is designed to acquaint young scholars with orical archaeology while recovering information needed for the development he historical site.

The 1975 summer program is open to students with prior experience in archeogy. While employed as excavators, they will have the opportunity to practheir skills by assisting professional staff in recording and analyzing archaeal features.

In alternate years participants receive practical field experience in digging, ld keeping, drawing, photographing, and surveying. Afternoon classes are ed for instruction in making site maps, using a dark room, and identifying acts. In rotation, students work in the laboratory and assist in directing the vation. Weekly seminars, led by staff members and visiting scholars, exthe broader implications of archaeology for the study of history.

e program is supervised by the archaeological staff of the St. Mary's City

Commission under the direction of Garry W. Stone. For further information and applications, write to Robert L. Humphrey, Jr., Associate Professor of Anthropology, or Howard Gillette, Jr., Assistant Professor of American Civilization, George Washington University, Washington, D.C. 20052. Complete applications must be submitted by March 15.

AMERICAN CIVILIZATION OR ANTHROPOLOGY

296–10 **Advanced Field Research in Historical Archaeology** (3)
Experience in the recording, excavation, and analysis of archaeological factors. Prerequisites: prior archaeological experience and selection as paid excavator. First Session: As arranged.

Movement Education Workshop

MAY 14 TO JUNE 4

THE PURPOSE OF THIS WORKSHOP is to help teachers gain insight into the knowledge and skills necessary to solve current problems in movement education. Problems to be considered will include introducing movement education into public school programs, innovative equipment, individualizing instruction, perceptual-motor training programs, early childhood programs, etc. Outside specialists from the fields of early childhood and physical education will assist in the workshop.

Department preregistration and University admission by April 25 is required. The workshop is open to both graduate and undergraduate students. Three semester hours of credit may be earned, or the course may be audited. Graduate credit may be arranged. Students taking the course for credit must be admitted to the University.

Preregistration forms and additional information may be obtained from Jeanne Snodgrass, Associate Professor of Human Kinetics and Leisure Studies, Building K, George Washington University, Washington, D.C. 20052.

HUMAN KINETICS AND LEISURE STUDIES

184–10 **Workshop in Human Kinetics and Leisure Studies** (3) Snodgrass and Staff
Problems in movement education. May 14 to June 4: MTWThF 5–9 pm; field activities as arranged. Field study project: May 23 to June 4.

The New Journalism

FIRST SESSION—JUNE 2 TO JULY 9

THE DEPARTMENT OF JOURNALISM is offering an experimental course surveying "The New Journalism." Emphasis is on the impact of impressionistic writing and fiction techniques on nonfiction reporting, and on the role of advocacy in

ime areas of the field. Students study selected writers including Hersey, Ca-
te, Talese, Wolfe, Mailer, and others to identify influences and trends in their
nfiction work. The class assesses the present and probable future influence of
ew Journalism upon Washington-based and other media.
A reading list will be available in advance from the Department of Journal-
n, George Washington University, Washington, D.C. 20052.

URNALISM

160–10 **The New Journalism** (3) Robbins
Survey of the impact of fiction techniques on modern nonfiction reportage. Study of selected writers to identify influences and trends. MTWThF 11:10 am–12:30 pm.

Russian-East Asian Studies

E INSTITUTE FOR SINO-SOVIET STUDIES is offering a program of related courses
used on Russia, Eastern Europe, and East Asia. These courses are broad
ough to have general appeal as electives for the liberal arts student and suffi-
ntly specific to have vocational utility for the teacher of social studies. Regu-
faculty members will offer 13 courses in this program, nine in the first ses-
and four in the second. Each course carries 3 semester hours of credit.
dents majoring in Political Science should consult with their advisers before
tering for this work.
The following faculty will staff the courses in this program:
Franz Michael, *Professor of International Affairs and Far Eastern History*
Harold C. Hinton, *Professor of Political Science and International Affairs*
Vladimir Petrov, *Professor of International Affairs*
Charles F. Elliott, *Associate Professor of Political Science and International Affairs*
William R. Johnson, *Associate Professor of History*
Richard C. Thornton, *Associate Professor of History*
Steven A. Grant, *Assistant Professor of Russian History and International Affairs*

ST SESSION—JUNE 2 TO JULY 9

TORY

58–10 **History of Chinese Communism** (3) Thornton
Survey of the leadership, ideology, structure, and operation of the Chinese revolutionary movement from its founding to the present. MTWThF 4:10–5:30 p.m.

64–10 **Evolution of the Socialist Commonwealth** (3) Petrov
History of Soviet relations with East European countries and the socialist states of Asia, from the end of World War II to the break with the People's Republic of China; emphasis on the changes in form and substance in relations among the ruling communist parties. For graduate students; open to qualified undergraduate seniors. MW 6:10–8 pm.

237–10 **Seminar: Soviet Foreign Policy, 1917–1953** (3) Petrov
Revolutionary concept of diplomacy. Parallel instruments of foreign policy during the era of "capitalist encirclement," 1917–1939. From Nazi-Soviet partnership to the alliance with the West. Foreign policies of the cold war. TTh 6:10–8 pm.

388–10 **Readings in the History of Sino-Soviet Relations** (3) Thornton
1917 to the present. MW 6:10–8 pm.

396–10 **Readings in Modern Far Eastern History** (3) Johnson
As arranged.

POLITICAL SCIENCE

101–10 **Far East in the Modern World** (3) Michael
General character of Far Eastern societies and their response to the impact of America, Europe, and Russia; American policy in the Far East and the influence of world communism. MTWThF 8:10–9:30 am.

160–10 **Modern Communist Ideologies** (3) Elliott
Intensive study of modern communism; emphasis on its antecedents and possible evolution. Careers and ideas of leading figures: Marx, Lenin, Stalin, Khrushchev, and Mao. MTWThF 4:10–5:30 pm.

163–10 **Soviet Foreign Policy** (3) Elliott
Relations with United States, Third World, China; international communism; instruments of foreign policy; interrelationships of domestic and foreign policies; ideology and foreign policy. MTWTh 5:45–7:25 pm.

*194–10 **Governments of China and Japan** (3) Michael
Institutions and processes of government in contemporary China and Japan, with some historical background. Attention to ideological forces. MTWThF 9:40–11 am.

SECOND SESSION—JULY 9 TO AUGUST 15

HISTORY

145–11 **Imperial Russia** (3) Grant
(Formerly History of Russia: 18th and 19th Centuries)
From the reign of Peter the Great to the Russian Revolution. MTW ThF 9:40–11 am.

187–11 **History of Modern China** (3) Johnson MTW
China since 1840, particular attention to political developments. ThF 1:10–2:30 pm.

POLITICAL SCIENCE

193–11 **Governments and Politics of South and Southeast Asia** (3) Hinton
Domestic and international politics of the major states in the area. MTWThF 9:40–11 am.

* PSc 162 and 194 are related in their subject matter, and credit for only one may be applied toward a degree.

270–11 **Political and Social Institutions of Eastern Europe** (3) Gyorgy
Major political and social factors which have shared the inter-war, World War II, and post-war evolution of Eastern Europe; emphasis on selected countries. MWTh 3:10–5 pm.

For courses in Intensive Beginning Russian, consult departmental listings under Slavic Languages and Literatures.

Secondary School Honors Program

E OUTSTANDING SECONDARY SCHOOL STUDENT who wishes to enrich his aca-mic background and participate in a stimulating introduction to college work ncouraged to seek admission to George Washington University's Secondary hool Honors Program. The Honors Student is enrolled in regular college rses appropriate to his level of study, his background, and his aptitude as rmined through consultation with his high school counselors and advisers the University.

nce dormitory life is a vital part of the stimulating academic and cultural osphere of the campus and community, Honors Students are allowed to live hurston Hall, a modern, air-conditioned residence dormitory. Students from immediate metropolitan area may commute, but they are encouraged to re- in the dormitory. Honors Students living in the dormitory are supervised by l-trained resident counselors. A varied extracurricular program focusing the unique location of the University in the nation's capital has been ned to complement both the academic and social life of the campus.

redit earned in the Program is applicable toward a degree at George Wash-on University should the student later matriculate here. The transfer of it elsewhere depends upon the policies of the individual school to which the ent might later apply.

ll students admitted to the Program are appointed Scholars in the Second-School Honors Program and receive scholarships for a five-week session. dent students pay only $490, covering full tuition, board and room. Com-ng students receive a $94 scholarship for each 3- or 4-hour course. Lab-ory fees and cost of books are not included in these scholarships. The Pro-m is designed to include a normal summer session of two courses.

nce the Honors Program is limited to 80 secondary school students, admis-s competitive. A transcript of the applicant's grades to date, available test es, and evidence of emotional and intellectual maturity are criteria for sion.

pplication forms and further information may be obtained from Bjorn Net-, Director of the Secondary School Honors Program, Division of University dents, George Washington University, Washington, D.C. 20052.

o applications will be considered after June 15.

onsult the *Undergraduate and Graduate Catalogue* for fall–spring concur-program.

Summer Institute in Israel

A SEVEN-WEEK PROGRAM—JULY–AUGUST

A SPECIAL PROGRAM IN ISRAEL involves the study of the role which the geog
raphy, culture, and history of Israel have played in the growth and development
of Judaism, Christianity, and Islam. Special attention is given to the contribu
tions of archaeology, historical geography, history, and theology to the under
standing of these religions. Field trips provide opportunity for study on histori
cal sites.

Additional information, including costs of travel and tuition, may be obtained
from Professor Robert G. Jones, Chairman, Department of Religion, George
Washington University, Washington, D.C. 20052.

RELIGION

137–10 **The Land of Israel and the Growth of the Western Religions** (6) — Jones and Staf

Summer Institutes in Speech Pathology and Audiology

THE SPEECH PATHOLOGY AND AUDIOLOGY section of the Department of Speech
and Drama is offering two consecutive Institutes which consider specific com
munication problems of the school-age child. The content of these courses i
designed, through lectures, discussions, and demonstrations of current practice
and procedures, to enhance the knowledge of professionals in the field of com
munication disorders. Each course is supplemented with lectures and demon
strations by nationally known authorities who discuss a particular phase of th
course content. A student may earn up to 9 semester hours of graduate credi
during these Institutes. A prerequisite of 3 semester hours in the clinical man
agement of speech and/or language disorders is required of those registering fo
the speech pathology course work, and 3 semester hours of basic principles an
procedures in audiology are required of those registering for SPDR 290–10.

The following faculty staff the courses in this program:
James W. Hillis, *Professor of Speech*
Lloyd S. Bowling, *Professor of Speech and Hearing*
Joan R. Regnell, *Assistant Professor of Speech*
Diane M. Brewer, *Assistant Professor of Speech*

A descriptive brochure is available upon request from Lloyd S. Bowling
Director, Summer Institute in Speech Pathology, and Audiology, Department o
Speech and Drama, George Washington University, Washington, D.C. 2005

FIRST INSTITUTE—JUNE 11 TO JULY 9

SPEECH AND DRAMA — Bowlin

106–10 **Introduction to Audiology** (3)
Survey of the field of audiology. The effect of body-system pathologies o

the reception of speech and other acoustic stimuli. Procedures of pure-tone and speech audiometry. Clinical and educational services for the hearing-impaired. Prerequisite: SPDR 101. MTWTh 11:10 am–12:50 pm.

379–10 **Clinical Treatment of Language Disorders In Children** (3)
(Formerly Language Disorders III)
Language therapy for school children. Study of speech and language evaluation and therapy procedures in public schools based on modern linguistics and concepts. Video-taped demonstrations. Laboratory fee, $5. MTWTh 9:20–11 am.

380–10 **Management of the Hearing-impaired Child** (3) Brewer
Overall management approach to the hard-of-hearing child including diagnosis, parent counseling, amplification, educational placement, treatment programs and procedures, and re-evaluation. Emphasis on aural habilitation within an educational framework. Laboratory fee, $7.50. MTW Th 1–2:40 pm.

OND INSTITUTE—JULY 10 TO AUGUST 7

ECH AND DRAMA

373–11 **Treatment of Speech Articulation Disorders** (2) Hillis, Regnell
(Formerly Articulation Disorders III)
Continuation of SPDR 272. Laboratory fee, $5. MTWTh 9:20–11 am.

376–11 **Treatment of Fluency Disorders in Children** (2) Hillis
(Formerly Fluency Disorders III)
Continuation of SPDR 275. Laboratory fee, $5. MTWTh 11:10 am–12:50 pm.

382–11 **Organic Voice Disorders** (2) Regnell
(Formerly Voice Disorders III)
Continuation of SPDR 281. Laboratory fee, $5. MTWTh 1–2:40 pm.

COURSES OF INSTRUCTION

EXPLANATION OF COURSE NUMBERS

COLLEGES AND SCHOOLS OTHER THAN ENGINEERING AND APPLIED SCIENCE

First-group courses.—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the adviser and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisite to advanced courses, but they may not be taken for graduate credit.

Second-group courses.—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work in order to receive graduate credit.

Third-group courses.—Courses numbered from 201 to 300 in the Graduate School of Arts and Sciences, the School of Government and Business Administration, and the School of Public and International Affairs, and courses numbered 201 to 400 in the School of Education are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates.

Fourth-group courses.—Courses numbered 301 to 400 in the Graduate School of Arts and Sciences are limited to graduate students, but they are primarily for doctoral candidates. Courses numbered 301 to 400 in the School of Government and Business Administration are limited to doctoral students. In the School of Education fourth-group courses, numbered 401 to 500, are limited to graduate students with Master's degrees from accredited institutions.

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Courses numbered from 1 through 199 are planned for undergraduate credit, although certain courses may be taken for graduate credit when arrangements are approved in advance by the instructor and the Dean. Courses numbered 201 to 300 are planned for graduate credit and may in certain instances be taken by qualified undergraduate students. Courses numbered from 301 to 400 are primarily for doctoral students.

MESTER HOURS OF CREDIT

e number of semester hours of credit given for the satisfactory completion of ourse is in most cases indicated in parentheses after the name of the course.

T TO ABBREVIATIONS

e following abbreviations are used in this catalogue for course designations.

Acct	Accounting	HCA	Health Care Administration
AmCv	American Civilization	Hist	History
Anth	Anthropology	Jour	Journalism
AplSc	Applied Science	Mgt	Management Science
Art	Art	Math	Mathematics
ArTh	Art Therapy	ME	Mechanical Engineering
BSc	Biological Sciences	Med	Medicine
BAd	Business Administration	Mus	Music
Chem	Chemistry	OR	Operations Research
Chin	Chinese	Phil	Philosophy
Class	Classics	Phys	Physics
CSci	Computer Science	PSc	Political Science
Econ	Economics	Psyc	Psychology
Educ	Education	PAd	Public Administration
EE	Electrical Engineering	Rel	Religion
EAd	Engineering Administration	Slav	Slavic Languages and Literatures
Engl	English	Soc	Sociology
EHum	Experimental Humanities	Span	Spanish
HLS	Human Kinetics and Leisure Studies	SpEd	Special Education
FrS	Forensic Sciences	SPDR	Speech and Drama
Fren	French	Stat	Statistics
Geog	Geography and Regional Science	U&RP	Urban and Regional Planning
Geol	Geology		
Germ	Germanic Languages and Literatures		

Schedule of Classes for the Summer Sessions, which will be available in at the Office of the Registrar, will contain information about room assignand instructors for courses.
he University reserves the right to change or withdraw any of the following ses.

ounting

Mastro, *Chairman*

1–2 **Introductory Accounting** (3–3)

Basic understanding of accounting concepts, procedures, analyses, and reports; the accounting measurement and communication of significant economic and financial data. Prerequisite to Acct 2: Acct 1. Students who have received credit for Acct 115 cannot receive credit for Acct 1–2. First Session: Acct 1–10; Second Session: Acct 2–11. MTWTh 5:45–7:25 pm; Acct 2–12—MTWTh 7:35–9:15 pm.

101–11 **Cost and Budgetary Control** (3)
Cost behavior and volume-profit relationships, responsibility accounting standard costs, flexible budgets, cost structures for control and motivation relevant costs, cost concepts. Prerequisite: Acct 1–2. Students who hav received credit for Acct 193 or 215 cannot receive credit for Acct 101 Second Session: MTWTh 5:45–7:25 pm.

111–10 **Financial Statement Analysis** (3)
Analysis and interpretation of financial statements for the guidance o management, directors, stockholders, and creditors. Prerequisite: Acct 1–2 First Session: MTWTh 5:45–7:25 pm.

*115 **Survey of Financial Accounting** (3)
Development, presentation, and interpretation of financial accounting dat necessary to the management process. Students who have received credi for Acct 1–2 cannot receive credit for Acct 115. First Session: Sec tion 10—MTWTh 5:45–7:25 pm.

193–11 **Business Budgeting** (3)
Principles and procedures in the development, installation, and operatio of a system of budgetary control to aid management. Prerequisite: Acc 1–2. Students who have received credit for Acct 101 cannot receive credi for Acct. 193. Second Session: MTWTh 7:35–9:15 pm.

†215 **Survey of Managerial Accounting** (3)
Study of the nature, analysis, and interpretation of accounting reports pri marily from the management point of view. Prerequisite: Acct 1–2 or 115 Students who have received credit for Acct 101 cannot receive credit fo Acct 215. Second Session: Section 11—MWTh 6:10–8 pm.

262–10 **Business Income Taxation** (3)
Federal income tax concepts applicable to corporations, partnerships, an their owners; emphasis on tax planning factors in business decisions an tax research. First Session: MWTh 6:10–8 pm.

276–10 **Management Planning and Control** (3)
Integrative case study approach to management systems for planning, con trol, and decisions: value indices for organizational sub-units, transfer pric ing, contemporary control systems, accounting framework and cycle. Pre requisite: Acct 1–2 or 115. First Session: MWTh 8:10–10 pm.

282–11 **Accounting Information Systems** (3)
Development and application of accounting system theory, including analy sis, design, and implementation. Integration of automatic data processing accounting systems, and management information systems. Prerequisite Acct 1–2 or 115. Second Session: MWTh 6:10–8 pm.

299–10 **Thesis Seminar** (3)
First Session: As arranged.

300–10 **Thesis Research** (3)
Second Session: As arranged.

---

* Special sections of this course will be offered in Navy programs. Acct 115–11, for students in th Navy Graduate Financial Management Program, May 27 to July 15; hours to be arranged. Acc 115–12, for students in the Bachelor of Science in Health Care Administration degree program a the Naval School of Hospital Administration, Bethesda, Md., August 12 to November 15; hour to be arranged.

† A special section of this course, Acct 215–12, for students in the Navy Graduate Financial Man agement Program, will be offered July 16 to August 14; hours to be arranged.

merican Civilization

dministered by the American Studies Program, H.F. Gillette, Jr., *Director*

71–72 **Introduction to American Civilization** (3–3)

Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance. First Session: AmCv 71–10; Second Session: AmCv 72–11. MTWThF 11:10 am–12:30 pm.

192–10 **The American Cinema** (3)

First Session: MW 6–10 pm. (See The American Cinema, page 38.)

195–10 **Independent Study** (3)

Open to limited number of American Civilization majors with approval of instructor. First Session: As arranged.

225–26 **History of Washington, D.C.** (3–3)

First Session: 225–10; Second Session: 226–11. TTh 6:10–8 pm; field trips as arranged. (See Capital City Historical Seminar, page 39.)

250–10 **Orientation Course: Material Aspects of American Civilization** (3)

Familiarization with the historical collections of the Smithsonian Institution and selected collections of other museums in the Washington area. Open to advanced undergraduates and students in the master's and doctoral programs affiliated with the Smithsonian Institution. First Session: MW 10:10–12 am.

251–52 **Museum Research and Education** (3–3)

Supervised work and/or study under the direction of Smithsonian Institution staff members and research associates—museum visitor behavior, costumes and furnishings, and photography as historical documentation. First Session: AmCv 251–10; Second Session: AmCv 252–11. As arranged.

295–10 **Independent Study** (arr.)

Limited to Master's candidates. Permission of instructor, in writing, required. First Session: As arranged.

296–10 **Advanced Field Research in Historical Archaeology** (3)

A 10-week course, June 16 to August 22, at St. Mary's City, Md. (See Advanced Field Research in Historical Archaeology program, pages 41–42.)

299–300 **Thesis Research** (3–3)

First Session: 299–10 and 300–10. As arranged.

399–10 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Library of Congress. May be repeated for credit. First Session: As arranged.

400–10 **Dissertation Research** (arr.)

For Doctor of Philosophy candidates preparing dissertations based upon or

offering of the American Studies Program and the Department of Speech and Drama. Stu- may register under either designation.

offering of the American Studies Program and the Department of History. Students may under either designation.

significantly related to collections of the Library of Congress. Supervised by specialists at the Library. Prerequisite: AmCv 355–56. First Session: As arranged.

394–10 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Smithsonian Institution. May be repeated for credit. First Session: As arranged.

395–10 **Dissertation Research** (arr.)
For Doctor of Philosophy candidates preparing dissertations significantly related to the material aspects of American civilization. Students work under curatorial supervision at the Smithsonian Institution. Prerequisite: AmCv 351–52. May be repeated for credit. First Session: As arranged.

398–10 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. First Session: As arranged.

399–10 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. First Session: As arranged.

For information concerning programs in The American Cinema, Capital City Historical Seminar, and Advanced Field Research in Historical Archaeology, see pages 38–39, 41–42.

Anthropology

R.L. Humphrey, Jr., *Chairman*

Departmental prerequisite: Anth 1–2 is prerequisite to all other courses in Anthropology. This prerequisite may be waived by permission of instructor.

1–2 **Introductory Anthropology** (3–3)
Anth 1: survey of man's origin, physical evolution, and cultural history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior. First Session: Anth 1–10; Second Session: Anth 2–11. MTWThF 11:10 am–12:30 pm.

155–10 **Primitive Religion** (3)
Conceptions of the supernatural in nonliterate societies. Examination of religious beliefs and practices. Emphasis on religious process and change. First Session: MTWThF 1:10–2:30 pm.

170–10 **Cultures of the Caribbean** (3)
Study of the culture, history, and ways of life of the various cultural groups of the area up to the ethnographic present. First Session: MTWThF 9:40–11 am.

195 **Undergraduate Research** (3)
Individual research problems. May be repeated for credit. First Session: Section 10; Second Session: Section 11. As arranged.

215–10 **Field Methods in Cultural Ecology: Pre-Columbian Settlement Patterns in Mesoamerica** (3 or 6)

June 2 to June 30. (See Field Program in Pre-Columbian Cultural Ecology, Pages 40–41.)

290 **Advanced Museum Research** (3)

Supervised individual research and/or field work at the Smithsonian Institution, arranged in consultation with the Smithsonian and the Department of Anthropology. Admission by permission of the Chairman of the Department. May be repeated for credit. First Session: Section 10; Second Session: Section 11. As arranged.

295 **Research** (3)

May be repeated for credit. First Session: Section 10; Second Session: Section 11.

[illegible]96–10 **Advanced Field Research in Historical Archaeology** (3)

A 10-week course, June 16 to August 22, at St. Mary's City, Md. (See Advanced Field Research in Historical Archaeology program, pages 41–42.)

[illegible]99–300 **Thesis Research** (3–3)

Anth 299–10 and 300–10: both sessions.

For information concerning the Field Program in Pre-Columbian Cultural Ecology, and the Advanced Field Research in Historical Archaeology Program, see pages 40–42.

[illegible]plied Science

"Engineering and Applied Science."

[illegible]

[illegible]. MacDonald, *Chairman*

[illegible] HISTORY

[illegible]1–32 **Survey of Western Art** (3–3)

Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art. First Session: Art 31–10—MTWThF 11:10 am–12:30 pm. Second Session: Art 32–11—MTW ThF 9:40–11 am.

[illegible]6–10 **18th Century Art in Europe** (3)

Development of painting, sculpture, and architecture. First Session: MTWThF 1:10–2:30 pm.

109–11 **19th Century Art in Europe** (3)
Painting and sculpture. Second Session: MTWThF 1:10–2:30 pm.

110–11 **Contemporary Art** (3)
Painting and sculpture in 20th century Europe. Second Session: MT WThF 4:10–5:30 pm.

111–10 **Classical Archaeology** (3)
Archaeological monuments of classical civilizations, with intensive study of one or more areas selected from architecture, sculpture, painting, or minor arts. First Session: MTWThF 9:40–11 am.

113–11 **Baroque Art in Italy** (3)
Development of painting, sculpture, and architecture in 16th and 17th century Italy. Second Session: MTWThF 11:10 am–12:30 pm.

114–10 **Baroque Art in the North** (3)
Development of painting, sculpture, and architecture in 16th and 17th centuries in Holland, Flanders, Spain, France, Germany, and England. First Session: MTWThF 9:40–11 am.

117–11 **Medieval Art I** (3)
Architecture, sculpture, and painting of the early Christian and Byzantine periods. Second Session: MTWThF 9:40–11 am.

120–10 **Art of China and Japan** (3)
Architecture, painting, and sculpture of China, Korea, and Japan. First Session: MTWThF 1:10–2:30 pm.

147–11 **Pre-Columbian Art** (3)
Second Session: MTWTh 5:45–7:25 pm.

148–10 **19th Century American Painting** (3)
First Session: MTWThF 11:10 am–12:30 pm.

*207–10 **Modern Architecture** (3)
Development of modern architecture and building technology in Europe and America from the late 19th century to the present. First Session MTWThF 4:10–5:30 pm.

248 **Independent Research in Art History** (3)
For Master's degree candidates; open to limited number of qualified undergraduates, with permission. Independent research arranged in consultation with individual instructor and graduate adviser. May be repeated for credit. First Session: Section 10; Second Session: Section 11.

261–10 **Seminar: Problems in Art History** (3)
Topic for summer: 19th century art criticism. Recommended for Art History majors; open to limited number of qualified undergraduates, with permission of instructor. Theory, criticism, or methodology of art history. May be repeated for credit. First Session: MTWThF 1:10–2:30 pm.

289–90 **Thesis Research** (3–3)
Art 289–10 and 290–10: both sessions.

---

* May be taken for undergraduate credit with the approval of the instructor.

INE ARTS

less otherwise indicated, Fine Arts courses taught in University studios carry material or laboratory fees; students must purchase their own materials. boratory and material fees for courses taught at the Corcoran School of Art stated in the course description and are payable at the School. Additional duate and upper-level Fine Arts instruction may be arranged on an individual is with the supervision of the appropriate GWU faculty member.
Courses designated CSA are taught at the Corcoran School of Art; courses signated GWU are taught at George Washington University campus studios.

partmental prerequisite: Art 21–22 and 41–42 (students concentrating in otography substitute Art 23–24 for 41–42) or permission of the Department airman are prerequisite to all other studio courses in Art.

e Arts courses numbered 121 through 281 may be repeated for credit with roval of Department.

21–22 Design I: Basic (3–3)

Fundamental studies of principles and elements of design. Art 21: study of two-dimensional design. Art 22: three-dimensional studies. First Session: Art 21–10 (CSA)—MTWThF 1–4 pm; Art 21–11 (GWU)—MTWThF 4:10–7 pm. Second Session: Art 22–11 (GWU)—MTWThF 9–12 am.

23–24 Fundamentals of Photography (3)

Fundamental techniques of photography: emphasis on creative expression. Laboratory fee: Art 23 and 24 at GWU: $30. Art 23 and 24 at CSA: $30. First Session: Art 23–10 (CSA)—lecture, W 12:30–1:30 pm; laboratory, MTW 1:30–6 pm. First Session: Art 23–11 (CSA)—lecture, Th 12:30–1:30 pm; laboratory, ThFS 8 am–12:30 pm. First Session: Art 23–12 (CSA)—lecture, M 6–7 pm; laboratory, TW 6–10:30 pm and M 7–10:30 pm. First Session: Art 24–10 (CSA)—lecture, M 12:30–1:30 pm; laboratory, MTW 8 am–12:30 pm. First Session: Art 24–11 (CSA)—lecture, F 12:30–1:30 pm; laboratory, ThF 1:30–8 pm. Second Session: Art 23–13 (GWU)—lecture, MW 12–1 pm; laboratory section 30, MTW 8–12 am; laboratory section 31, MTW 1–5 pm.

41–42 Drawing I (3–3)

Concepts of drawing, traditional and contemporary; training in perception, analysis of form, use of media, and exercises in connoisseurship. First Session: Art 41–10 (CSA) and 42–10 (CSA)—MTWThF 9–12 am; Art 41–11 (CSA), and 42–11 (CSA)—MTWThF 1–4 pm; Art 41–12 (CSA) and 42–12 (CSA)—MTWThF 6–9 pm. Second Session: Art 41–13 (GWU)—MTWThF 1–4 pm. Material and model fee for Art 41–13, $15.

51–52 Ceramics I (3–3)

Working with clay as an art form. Basic techniques of hand building and wheel throwing. Laboratory fee: Art 51, $45; Art 52, $45. First Session: Art 51–10 (GWU)—MTWThF 9–12 am; Art 51–11 (CSA) and Art 52–10 (CSA)—MTWThF 1–4 pm; Art 51–12 (CSA) and 52–11 (CSA)—MTWThF 6–9 pm. Second Session: Art 51–13 (GWU)—MTWThF 1–4 pm.

---

ired of all Fine Arts majors.

61–10 Water Color (3) CSA

Painting in transparent and opaque water color and in acrylic. Experi
mentation, figurative and landscape. First Session: MTWThF 9–12 am

65–66 Painting I (3–3) CSA

Emphasis on personal expression with exposure to a variety of styles an
attitudes. Use of acrylic and oil. First Session: Art 65–10 and 66–10—
MTWThF 9–12 am; Art 65–11 and 66–11—MTWThF 1–4 pm. Art 65 1
and 66–12—MTWThF 6–9 pm.

81–82 Sculpture I (3–3) CSA

Three-dimensional design. Basic sculptural techniques; modeling, carving
and construction. Media include wood, clay, stone, plaster. Laborator
fee: Art 81, $25; Art 82, $25. First Session: Art 81–10 and 82–10—
MTWThF 9–12 am.

125–26 Painting II (3–3) CSA

Emphasis on personal expression; exposure to a variety of styles and att
tudes. Materials and techniques subordinate to individual experimentation
Use of acrylic and oil. First Session: Art 125–10 and 126–10—MTW
ThF 9–12 am; Art 125–11 and 126–11—MTWThF 1–4 pm; Art 125–1
and 126–12—MTWThF 6–9 pm.

127–28 Painting III (3–3)

Exploration of problems in developing a personal visual imagery. Firs
Session: Art 127–10 (CSA)—MTWThF 9–12 am; Art 127–11 (CSA)—
MTWThF 1–4 pm; Art 127–12 (CSA)—MTWThF 6–9 pm; Art 127–1
(GWU)—MTWThF 9–12 am; material fee for Art 127–13, $12. Art 128
10 (CSA)—MTWThF 9–12 am; Art 128–11 (CSA)—MTWThF 1–4 pm
Art 128–12 (CSA)—MTWThF 6–9 pm.

131–32 Ceramics II (3–3)

Development of techniques with emphasis on quality and creativity. Lab
oratory fee: Art 131, $45; Art 132, $45. First Session: Art 131–1
(GWU), Art 131–11 (CSA), and Art 132–10 (CSA)—MTWThF 9–1
am; Art 131–12 (CSA) and Art 132–11 (CSA)—MTWThF 1–4 pm: A
131–14 (CSA) and Art 132–12 (CSA)—MTWThF 6–9 pm. Second Se
sion: Art 131–13 (GWU)—MTWThF 9–12 am.

135–10 Advanced Water Color (3) CSA

Development of techniques of water color; concentration on special pro
ects. First Session: MTWThF 9–12 am.

137–11 Workshop in Materials, Methods, and Techniques (3) GWU

Drawing in charcoal, crayon, and pen; painting and preparation of ground
for tempera, encaustic, fresco buono, oil, water color, polymer, and mixe
techniques; graphic techniques in woodcut, engraving, etching. Materi
and model fee, $10. Second Session: MTWThF 1–4 pm.

143–44 Serigraphy (3–3) GWU

Advanced problems in serigraphy; emphasis on its aesthetic possibilitie
Prerequisite: Art 57–58. Laboratory fee: Art 143, $15; Art 144, $1
First Session: Art 143–10—MTWThF 9–12 am; Art 144–10—MTWTh
1–4 pm.

151–52 **Ceramics III** (3–3) CSA

Development of techniques with emphasis on quality and creativity. Students mix own clay and glazes. Laboratory fee: Art 151, $45; Art 152, $45. First Session: Art 151–10 and 152–10—MTWThF 9–12 am; Art 151–11 and 152–11—MTWThF 1–4 pm; Art 151–12 and 152–12—MTWThF 6–9 pm.

157–58 **Graphics III** (3–3) CSA

Exploration of combined techniques and mixed media. Prerequisite: Art 153–54. Material fee for Art 157–10 and 158–10, $30. First Session: Art 157–10 and 158–10—MTWThF 9–12 am.

159–60 **Drawing II** (3–3)

Development of drawing. Individual study, application and extensions of drawing. First Session: Art 159-10 and 160–10 (CSA)—MTWThF 6–9 pm. Art 159–11 (GWU)—MTWThF 1–4 pm. Material and model fee for Art 159–11, $15 a semester.

179–80 **Sculpture II** (3–3) CSA

Concepts of sculpture; new materials and developments. Laboratory fee: Art 179, $25; Art 180, $25. First Session: Art 179–10 and 180–10—MTWThF 9–12 am.

181 **Intermediate Photography** (3)

Basic problems. Introduction to color photography with emphasis on creative expression. Prerequisite: Art 23–24 or permission of instructor. Laboratory fee, $30. First Session: Art 181–10 (GWU) lecture MW 12–1 pm; laboratory section 30, MTW 8–12 am; laboratory section 31, MTW 1–5 pm; Art 181–11 (CSA) lecture M 12:30–1:30 pm; laboratory MTW 8 am–12:30 pm.

189–90 **Sculpture III** (3–3) CSA

Advanced study concentrating on relevance of scale and media. Relationship of sculpture to the environment. Laboratory fee: Art 189, $25; Art 190, $25. First Session: Art 189–10 and 190–10—MTWThF 9–12 am.

205–10 **Advanced Photography** (3) CSA

Advanced problems in photography; emphasis on individual development. Prerequisite: Art 181–82 or permission of instructor. Laboratory fee, $25. First Session: lecture M 12:30–1:30 pm, laboratory MTW 8 am–12:30 pm.

296–10 **Photography: Special Projects** (3) GWU

Laboratory fee, $30. First Session: As arranged.

251–52 **Ceramics IV** (3–3) CSA

Development of techniques with emphasis on quality and creativity. Students mix own clay and glazes. Laboratory fee: Art 251, $45; Art 252, $45. First Session: Art 251–10 and 252–10—MTWThF 9–12 am; Art 251–11 and 252–11—MTWThF 1–4 pm; Art 251–12 and 252–12 MTW ThF 6–9 p.m.

353–10 **Ceramics V** (3) CSA

Laboratory fee, $45. First Session: As arranged.

365–66 **Painting IV** (3–3) CSA

Creative painting; students work on independent projects as well as as-

signed problems. First Session: Art 265–10 and 266–10—MTWThF 9–12 am; Art 265–11 and 266–11—MTWThF 1–4 pm; Art 265–12 and 266–12—MTWThF 6–9 pm.

279–80 **Sculpture IV** (3–3) CSA

Laboratory fee: Art 279, $25; Art 280, $25. First Session: Art 279–10 and 280–10—MTWThF 9–12 am.

281–10 **Sculpture V** (3) CSA

Laboratory fee, $25. First Session: MTWThF 9–12 am.

299–300 **Thesis Research** (3–3)

Art 299–10 and 300–10: both sessions.

Art Therapy—Graduate Study

B.I. Levy, *Program Director*

283–84 **Practicum in Art Therapy** (3–3)

Field experience. On-the-job supervision supplemented by supervision from the therapy staff. Prerequisite: ArTh 201, 203, and consultation with adviser prior to registration. First Session: ArTh 283–10, 284–10; Second Session: ArTh 283–11, 284–11. As arranged.

285 **Special Projects in Art Therapy** (3)

Individual work based on study, research, or practice. Details to be worked out with each student. Resource people may be called upon to assist, as appropriate. May be repeated for credit with approval of adviser. First Session: Section 10; Second Session: Section 11. As arranged.

Biological Sciences

A.H. Desmond, *Chairman*

Departmental prerequisite: BiSc 11–12 or equivalent is prerequisite to all second-group courses in Biology, Botany, and Zoology, except by permission of the instructor.

3–4 **Introductory Biology for Nonscience Majors** (3–3)

Survey of biological principles; emphasis on man as a functional organism in his environment. Prerequisite to BiSc 4: BiSc 3. Material fee, $15 each session. First Session: BiSc 3–10; Second Session: BiSc 4–11—MTW 6–9:20 pm. Laboratory: Section 30, 31. As arranged. Both sessions.

11–12 **Introductory Biology for Science Majors** (4–4)

Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Prerequisite to BiSc 12: BiSc 11. Material fee, $18 each session. First Session: BiSc 11–10; Second Session: BiSc 12–11—MTWThF 9:40 am–1 pm. Laboratory: Section 30, 31. As arranged. Both sessions.

104–10 **Comparative Vertebrate Anatomy** (4)

Evolution and comparative morphology of vertebrates, stressing recent forms. Material fee, $20. First Session: MTWThF 6–9:20 pm. Laboratory as arranged.

122–11 **Cell Biology I: Molecular and Subcellular Biology**

Structure and function of biological molecules, viruses, and cellular organelles. Prerequisite: one semester of organic chemistry. Second Session: MTWTh 5:45–7:25 pm.

140–10 **General Ecology** (4)

Lecture (3 hours), laboratory, and field (3 hours). Introduction to the concepts of limiting factors, biogeochemical cycles, trophic levels, and energy transfer, and their relationship to the structure and function of populations, species, communities, and ecosystems. Material fee, $20. First Session: MTWThF 9:40 am–1 pm. Laboratory as arranged.

171 **Undergraduate Research** (arr.)

Admission by permission of the staff member concerned. May be repeated for credit. Prerequisite: Chem 50 or 152; 16 semester hours in Biological Sciences courses. Material fee, $20. First Session: Section 10; Second Session: Section 11. As arranged.

295 **Research** (arr.)

Investigation of special problems. May be repeated for credit. First Session: Section 10; Second Section: Section 11.

99–300 **Thesis Research** (3–3)

BiSc 299–10 and 300–10: both sessions.

398–10 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399–10 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

siness Administration

r Black, *Chairman*

101–10 **The Business Environment** (3)

Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues. First Session: MTW ThF 1:10–2:30 pm.

102–10 **Fundamentals of Management** (3)

Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking. First Session: MTWThF 9:40–11 am.

105–10 **Personnel Management** (3)

The labor force and labor markets. Industrial personnel and manpower programs, organization and policy in personnel activities. First Session: MTWThF 4:10–5:30 pm.

131–10 **Business Finance** (3)

Analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, sources of funds, capital budgeting, stockholder relationships. Prerequisite: Acct 1–2; Econ 1; Math 30, 31; Stat 51. First Session: MTWTh 7:35–9:15 pm.

132–10 **International Business Finance** (3)

Principles, practices, problems, and institutions of international finance. Emphasis on international financial markets, exchange rates, balance-of-payments restraints, and governmental policies. Prerequisite: BAd 131. First Session: MTWThF 4:10–5:30 pm.

141–10 **Basic Marketing Management** (3)

Marketing and marketing management, consumer and demand analysis, retailing, wholesaling. Emphasis on major decision areas and tools. Prerequisite: BAd 102, Econ 1–2. First Session: MTWThF 4:10–5:30 pm.

161–10 **Commercial Law**

Fundamental concepts and principles of law encountered in business activity; contracts, bailments, agency, sales, negotiable instruments, bankruptcy, other topics. Basic legal considerations in business decision-making. First Session: MTWTh 7:35–9:15 pm.

175–10 **Introduction to International Business** (3)

Physical movement of goods in international business; conditions essential for successful trading; export shipment, documentation, procedural problems. Emphasis on ocean marine insurance and export traffic management policy. Prerequisite: Econ 1–2. First Session: MTWTh 7:35–9:15 pm.

181–10 **Manufacturing Production** (3)

Basic principles and methods of manufacturing production. Manufacturing facilities, plant and equipment. Illustrations selected from various process and fabrication industries. Prerequisite: Math 51, 52; Stat 51 or equivalent. First Session: MTWTh 5:45–7:25 pm.

199 **Individual Research** (3)

Assigned topics. Admission by prior permission of adviser. May be repeated once for credit. First session: Section 10; Second Session: Section 11. As arranged.

231–11 **Financial Decision-making** (3)

Functions and objectives of financial management, asset management, problems of internal financial analysis, rate-of-return analysis, financial forecasting, problems of capital demand and supply. Prerequisite: Acct 115 or equivalent, BAd 131. Second Session: MTWTh 5:45–7:25 pm.

233–11 **International Business Finance** (3)

Analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: BAd 131 or equivalent. Second Session: MTWTh 7:35–9:15 pm.

237–10 **Investment Analysis** (3)

Risk-reward analysis of security investments including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory and computer methods. Prerequisite: BAd 131. First Session: MWTh 4:10–6 pm.

241–10 **Marketing Management** (3)

Marketing management problems: market segmentation, product planning, channels of distribution, advertising, personal selling, sales promotion, pricing and development of integrated marketing programs. First Session: MTWTh 7:35–9:15 pm.

248–10 **International Marketing** (3)

Organization for international marketing, demand analysis, product development and policies, marketing structure and trade channels, advertising and promotion problems and policies, pricing, and legal aspects. Effective international marketing strategy. First Session: MWF 4:10–6 pm.

255–11 **Multinational Corporations in the World Economy** (3)
(Formerly International Business in Perspective)

Business in the world economy; multinational corporations as economic, political, and social institutions; ownership and growth strategies, relationships to other nations; national and international controls; future of the multinational corporation. Second Session: MWF 6:10–8 pm.

257–11 **Business Policy in the Multinational Firm** (3)
(Formerly Operation of the Multinational Firm)

International market entry and expansion; operating policies, procedures, and problems of multinational companies; developing executives for international business. Prerequisite: advanced Master's degree standing. Second Session: MWF 6:10–8 pm.

259–10 **Comparative Business Management** (3)

Primarily for doctoral students. Comparative analysis of business practices and management in different countries and economic systems. Generic characteristics of management and of business enterprises and how these are modified in different environments. Influence on the level of economic development, social structure, history, and culture of a country. Prerequisite: Mgt 201 or equivalent. First Session: MWF 6:10–8 pm.

260–10 **Economics for Management** (3)

For students in the Navy Graduate Financial Management Program only. Economic theory and its application in managerial decision-making; price theory, income and employment theory, related topics. Review of economic methodology. July 16–August 14: As arranged.

265–10 **Seminar: Applied Economics** (3)
(Formerly Seminar in Managerial Economics)

Primarily for doctoral students. Special topics and applications of analytical tools to business decision-making and policy. Prerequisite: BAd 261, 262; or permission of instructor. First Session: TTh 6:10–9 pm.

280–10 **Procurement and Contracting** (3)

Overview of procurement and contracting; emphasis on federal government buying policies, practices, and procedures. First Session: MWF 4:10–6 pm.

283–10 **Pricing and Negotiation** (3)

Scope and objectives of negotiated procurement; preparation, conduct and recording of negotiations; analysis of cost, price, profit, investment and risk; cost principles; incentives; relationship of contract type to work requirements; techniques of negotiation. Prerequisite: BAd 280 or permission of instructor. First Session: MWF 6:10–8 pm.

284–10 **Procurement Data Management** (3)

Technical data and the procurement process; contract-controlling documentation, patent rights, rights in data, requirements determination and the acquisition of data, federal policies, contractor interests. Configuration management; control of changes. Prerequisite: BAd 280 or permission of instructor. First Session: MWF 8:10–10 pm.

291–11 **Seminar: Business Management** (3)

Primarily for doctoral students. Research on various phases of management as practiced in American industry. Second Session: MWF 4:10–6 pm.

298 **Directed Readings and Research in Business Administration** (3)

(Formerly Readings in Business)

Supervised readings in selected fields within business administration. Admission by prior permission of instructor. May be repeated once for credit. First Session: Section 10, Section 11. As arranged.

300–10 **Thesis Research** (3)

Second Session: As arranged.

398–10 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Business Administration general examination. May be repeated for credit. Second Session: As arranged.

399–10 **Dissertation Research** (arr.)

Limited to Doctor of Business Administration candidates. May be repeated for credit. Both sessions.

Chemistry

A.D. Britt, *Chairman*

11–12 **General Chemistry** (4–4)

Elementary course in general chemistry, including qualitative analysis. Prerequisite to Chem 11: one year of high school algebra. Prerequisite to Chem 12: Chem 11. Laboratory fee, $23 each session. First Session: Chem 11–10; Second Session: Chem 12–11. MWF 8:10 am–1 pm; TTh 8:10–11 am.

110–10 **Introduction to Physical Chemistry** (3)

Topics include chemical thermodynamics, chemical kinetics, electrochemistry, solution chemistry, membrane and phase equilibria, and others. Prerequisite: Chem 16 or 22, Math 31, Phys 2; or permission of instructor

Not open to chemistry majors. May not be taken for credit by students who have received credit for Chem 111–12 or an equivalent course. A 6-week course, June 2 to July 16: MTWTh 6–7:15 pm.

151–52 **Organic Chemistry** (3–3)

Chemistry of the compounds of carbon. Prerequisite to Chem 151: Chem 12 or 16. Prerequisite to Chem 152: Chem 151. First Session: Chem 151–10; Second Session: Chem 152–11. MTWThF 8:10–9:40 am.

153–54 **Organic Chemistry Laboratory** (1–1)

Laboratory complement of Chem 151–52. Prerequisite or concurrent registration: Chem 151–52. Prerequisite to Chem 154: Chem 153. Laboratory fee, $23 each session. First Session: Chem 153–10; Second Session: Chem 154–11. MWF 9:50 am–1 pm.

195 **Undergraduate Research** (arr.)

Research on problems approved by the staff. May be repeated once for credit. Laboratory fee, $12 a semester hour. First Session: Section 10; Second Session: Section 11. As arranged.

295 **Research** (arr.)

Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit not to exceed a total of 8 semester hours. Laboratory fee, $12 a semester hour. First Session: Section 10; Second Session: Section 11.

99–300 **Thesis Research** (3–3)

Chem 299–10—both sessions; laboratory fee, $23 each session. Chem 300–10—both sessions; laboratory fee, $23 each session.

398–10 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy cumulative examinations. May be repeated for credit. Both sessions.

399–10 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

lassics

n E. Ziolkowski, *Chairman*

URSES IN ENGLISH TRANSLATION

64–10 **Greek and Latin Origins of English Words** (3)

Study of Greek and Latin roots in English to improve vocabulary and facilitate understanding of the language of science, philosophy, politics, etc. Survey of the historical contact between Latin and English. First Session: MTWThF 9:40–11 am.

108–11 **Classical Mythology** (3)

Mythology of the Greeks and Romans from the creation of the world: tales of the gods, heroes, and great families that have influenced literature, art, and music. Second Session: MTWThF 9:40–11 am.

113–10 **Greek and Roman Drama** (3)
Selected masterpieces of Greek and Roman tragedy and comedy. First Session: MTWThF 11:10 am–12:30 pm.

170–11 **Women in Classical Antiquity** (3)
In-depth study and discussion of readings from ancient and modern sources on the role of women in Greek and Roman society. Second Session: MTWThF 11:10 am–12:30 pm.

185–11 **Directed Reading** (1–3)
Directed reading in Greek or Latin. Admission by permission of instructor. Second Session: As arranged.

Computer Science

See "Engineering and Applied Science."

Economics

Charles Stewart, Jr., *Chairman*

Departmental prerequisite: Econ 1–2 is prerequisite to all other courses in Economics except for Econ 217–18.

1–2 **Principles of Economics** (3–3)
Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2. First Session: Econ 1 Section 10—MTWThF 9:40–11 am, Section 11—MTWTh 5:45–7:25 pm. Second Session: Econ 1 Section 12—MTWThF 1:10–2:30 pm; Econ 2 Section 11—MTWThF 9:40–11 am, Section 12—MTWTh 5:45–7:25 pm.

101–10 **Intermediate Microeconomic Theory** (3)
Analysis of supply, demand, and pricing. First Session: MTWThF 9:40–11 am.

102–10 **Intermediate Macroeconomic Theory** (3)
Theories of national income determination and growth. First Session: MTWThF 11:10 am–12:30 pm.

121–11 **Money and Banking** (3)
Nature of money, credit, commercial banking, and other financial institutions in the U.S. monetary system. Second Session: MTWTh 5:45–7:25 pm.

181–82 **International Economics** (3–3)
Econ 181: international trade theory and international monetary theory. Econ 182: continuation of international monetary theory; economic development. First Session: Econ 181–10; Second Session: Econ 182–11. MTWTh 5:45–7:25 pm.

202–10 **History of Economic Thought** (3)

Critical analysis and interpretation of the development of economic theory from Plato through the "Keynesian Revolution" and the "Monetarist Counter-revolution." First Session: MWTh 6:10–8 pm.

217–18 **Survey of Economics** (3–3)

For graduate students in fields other than Economics. Econ 217: price theory. Econ 218: income and employment theory. Departmental prerequisite waived. First Session: Econ 217–10—MWTh 6:10–8 pm; 218–10—TThF 9:10–11 am. Second Session: Econ 217–11—MWTh 9:10–11 am; 218–11—MWTh 6:10–8 pm.

299–300 **Thesis Research** (3–3)

Econ 299–10 and 300–10: both sessions.

305–11 **Seminar: Macroeconomics** (3)

Selected topics in macroeconomics. Prerequisite: Econ 205. June 30 to August 15. MW 4:10–6 pm.

390–10 **Seminar: International Economic Theory** (3)

Limited to graduate students, primarily for doctoral students. Examination of recent contributions in this field. First Session: MWTh 6:10–8 pm.

398–10 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399–10 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

ducation

onald Linkowski, *Chairman*

partmental prerequisite: a degree from an accredited institution is prerequi- e to all third-group courses in Education. Adequate professional preparation prerequisite to all third-group courses in Education except for those courses ited to students in the M.A.T. degree program.

See also courses in Human Kinetics and Leisure Studies, page 85, and in Special Education, pages 106–108.

ST 3-WEEK WORKSHOP SESSION—JUNE 16 TO JULY 3

ncurrent registration for another 3-week workshop course is not permitted.

112–10 **Educational Measurement** (3)

Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123. MTWThF 4:30–6:30 pm.

207–10 **Curriculum Materials** (3–6)

For experienced teachers. Construction of course of study and classroom teaching aids, with direct application to students' situations. June 16 to 27: 4:30–6:30 pm; June 30 to July 3: 8–10 am.

237–10 **Systems Approach to Instructional Design** (3)

Application of systems techniques to the development of an instructional program. MTWTh 4:30–8:30 pm.

243–10 **Human Relations in Education** (3)

Principles and practices in human relations between and among learner, teacher, other school personnel, and parents. MTWThF 5–7 pm.

251–10 **Foundations of Counseling** (3)

(Formerly Foundations of Guidance and Personnel Services)

Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues. MTWThF 4:30–6:30 pm.

258–10 **Theories and Techniques of Counseling** (3)

(Formerly Techniques of Counseling)

Theories and practices of vocational, educational, and personal counseling. Prerequisite: 12 semester hours in guidance and counseling, including Educ 253 and 257. MTWThF 4:30–6:30 pm.

295–10 **Quantitative Methods II: Research Procedures** (3)

Required of all candidates for graduate degrees in Education. Analysis of scientific approaches to problems in education; evaluation of research techniques. Prerequisite: Educ 212 or equivalent. A 6-week course, June 16 to July 25: MW 6:40–9 pm.

302–10 **Quantitative Methods III: Inferential Techniques** (3)

Educ 302 or Stat 105 is required of all doctoral students in Education. Prerequisite: Educ 295 or a basic statistics course and permission of instructor. A 9-week course, June 16 to August 15: TTh 6:40–9 pm.

336–10 **Practicum in Reading** (3)

Supervised experience in testing and teaching in the Reading Center. Approximately 120 class hours required. Laboratory fee, $10. Admission by permission of instructor. A 6-week course, June 16 to July 25: As arranged.

380–10 **Sensitivity Training: Laboratory Method** (3)

A sensitivity learning experience in human relations using unstructured group experience, individual feedback, experimentation, and practice. Admission by permission of Department, prior to registration. MTW ThF 4:30–6:30 pm.

SECOND 3-WEEK WORKSHOP SESSION—JULY 7 TO JULY 25

Concurrent registration for another 3-week workshop course is not permitted.

201–11 **Seminar: International Education** (3)

Survey of selected foreign educational systems and cultures. Research, techniques, and materials to develop world-mindedness. Embassy resources utilized. MTWThF 9–11 am.

219–11 **Elementary School Classroom Procedures** (3)

Current theories of teaching and learning and their application to teaching acts and strategies of elementary school teachers. MTWThF 10–12 am.

223–11 **Foundations of Reading Instruction** (3)

Historical and psychological background; evaluation of recent methods, materials, and techniques in teaching reading; demonstrations of diagnostic and teaching techniques. MTWThF 10–12 am.

245–11 **School and Community** (3)

The school as an important member of a team of social agencies that builds the community. MTWThF 10–12 am.

257–11 **Career Development and Information** (3)
(Formerly Educational and Occupational Development)

Theories of career development; factors influencing the world of work; procedures for evaluating and using socio-personal, educational, and occupational information. MTWThF 10–12 am.

317–11 **Curriculum Developments in Elementary School Science** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school science curriculum. Admission by permission of instructor. MTWThF 8–10 am.

320–11 **Curriculum Developments in Elementary School Mathematics** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school mathematics curriculum. Admission by permission of instructor. MTWThF 8–10 am.

354–11 **Counseling of Minority Groups** (3)

Consideration of problems and approaches related to counseling cultural and racial minorities in American society; emphasis on counseling the disadvantaged in urban areas. MTWThF 4:30–6:30 pm.

357–11 **Personal and Social Adjustment** (3)
(Formerly Mental Hygiene)

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. MTWThF 10–12 am.

373–11 **The Community-Junior College** (3)
(Formerly the Junior-Community College)

The two-year college as it relates to secondary education, four-year colleges, and universities. Objectives, curricula, students, faculty, legal concerns, and special problems of two-year colleges. MTWThF 4:30–6:30 pm.

8-WEEK SESSION—JULY 7 TO AUGUST 15

108–11 **Human Development, Learning, and Teaching** (3)

Principles of effective teaching based on an understanding of human development and the nature of learning. Prerequisite: Psyc 22; Psyc 29 or 112. MW 6:40–9 pm.

118–11 **Elementary Reading: Classroom Diagnosis and Instruction** (3)

Emphasis on diagnostic procedure aimed at individualizing and improving classrooom instruction. Prerequisite: Educ 115 or equivalent. Concurrent registration in Educ 119 required for students in the M.A.T. in elementary education degree program. MW 1–3:20 pm.

123–11 **Society and the School** (3)

Historical and social development of education, contemporary issues, cooperation of the school with other community agencies, functions of school personnel. TTh 6:40–9 pm.

154–11 **Community Resources and Materials for the Young Child** (3)

Interaction with community for services and resources; physical facilities, including play activities and curriculum materials for the young child. Admission by permission of instructor. MW 6:40–9 pm.

209–11 **Child Development** (3)

Interdisciplinary approach to child development and behavior. Practical implications of research in disciplines contributing to knowledge about childhood. MW 1–3:20 pm.

229–11 **Administration of Elementary Education** (3)

For experienced teachers and administrators. Achieving instructional objectives, organizing and servicing teaching activities, coordinating school and community life. TW 4–6:20 pm.

231–11 **Secondary School Classroom Procedures** (3)

Current classroom practices: teacher-pupil planning, group procedures, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature. TTh 8–10:20 am.

271–11 **The Teacher and School Administration** (3)

Role of federal, state, and local administrative units: school finance; legal controls; school plant; public support; improving teaching conditions. TW 6:40–9 pm.

293–94 **Research and Independent Study** (3–3)

Individual research under guidance of a staff member. Program and conferences arranged with an instructor. Educ 293–11 and 294–11.

295–11 **Quantitative Methods II: Research Procedures** (3)

Required of all candidates for graduate degrees in Education. Analysis of scientific approaches to problems in education; evaluation of research techniques. Prerequisite: Educ 212 or equivalent. MTh 6:40–9 pm.

299–300 **Thesis Research** (3–3)

Required of Master of Arts in Education candidates writing Master's theses. Educ 299–10 and 300–10.

306–11 **Quantitative Methods IV: Advanced Research Design** (3)

Required of all doctoral students in Education. Evaluation and application of educational research designs. Prerequisite: Educ 302 or equivalent. MW 6:40–9 pm.

310–11 **Museum Studies** (3)

Limited to students in the M.A.T. program in museum education. Study of museums' functions and their relationship to museum educational roles. MTWThF 1–5 pm.

311–11 **Museum Audiences** (3)

Limited to students in the M.A.T. program in Museum Education. Study of the many audiences of many ages who use and enjoy museums. MTWThF 9–12 am.

334–11 **Community Resources and Materials for the Young Child** (3)

Interaction with community for services and resources; physical facilities, including play activities and curriculum materials for the young child. MW 6:40–9 pm.

341–11 **Cognitive Models and Instruction** (3)

Cognitive models (Guilford, Piaget, etc.) are analyzed as the theoretical basis for planning instructional episodes appropriate at various levels—childhood through adulthood. TTh 1–3:20 pm.

355–11 **Counseling in Groups** (3)

Principles of group dynamics as related to interaction within groups. Techniques and practice in group counseling. TTh 6:40–9 pm.

383–11 **Counseling of Adults** (3)

Theories and practical application of personal counseling, emphasizing distinct needs of adults and young adults in occupational settings; for supervisors, instructors, and counselors in military, government, business, and industry settings. MW 6:40–9 pm.

385–11 **Collective Negotiations in Higher Education** (3)

Theory, practice, problems, and issues in collective negotiations in higher education. TTh 6:40–9 pm.

490–11 **Pre-dissertation Seminar** (3)

Required of all Ed.D. degree candidates. Approval of the dissertation prospectus is necessary for successful completion of the seminar. Admission by permission of instructor. TTh 6:40–9 pm.

HIRD 3-WEEK WORKSHOP SESSION—JULY 28 TO AUGUST 15

asses meet Monday through Friday. Concurrent registration for another 3-eek workshop course is not permitted.

128–12 **Children's Literature** (3)

Newer books for children and the children's classics, contribution of literature to child development. Lecture 8:10–10 am.

202–12 **Seminar: International Education** (3)

Survey of selected foreign educational systems and cultures. Research, techniques, and materials to develop world-mindedness. Embassy resources utilized. Lecture 9:10–11 am.

208–12 **Human Development** (3)

Consideration of human development and behavior throughout the life span; emphasis on practical implications of relevant interdisciplinary research. Lecture 10:10–12 am.

253–12 **Individual Appraisal in Counseling** (3)
(Formerly Analysis of the Individual for Purposes of Counseling)
Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite: Educ 112 or equivalent. Lecture 10:10–12 am.

Electrical Engineering

See "Engineering and Applied Science."

Engineering Administration

See "Engineering and Applied Science."

Engineering and Applied Science

APPLIED SCIENCE

ApSc 57, 58, and 113 are administered by the Department of Civil, Mechanical, and Environmental Engineering, S.W. Yuan, *Chairman*.
ApSc 115 is administered by the Department of Operations Research, W.H. Marlow, *Chairman*.

57–10 **Analytical Mechanics I** (2)
First half of a one-year sequence. Concepts of statics, including force systems, equilibrium conditions, simple structures, distributed forces, shear and moments, friction and the concept of work, virtual work and stability. Prerequisite or concurrent registration: ApSc 113, Phys 2. First Session: MWF 4:10–5:45 pm.

58–11 **Analytical Mechanics II** (3)
Second half of a one-year sequence. Concepts of dynamics, including kinematics of particles, velocity and acceleration, Newton's laws of motion, momentum, work, kinetic energy, potential energy, central force fields, vibrations, resonance, dynamics of systems of particles, kinematics of a rigid body, dynamics of a rigid body. Introduction to Lagrangian-Hamiltonian formulation. Prerequisite: ApSc 57. Second Session: MTWTh 5:45–7:25 pm.

113–11 **Engineering Analysis I** (3)
Analytical methods appropriate to the solution of engineering problems, including application of matrices and linear algebra; ordinary differential equations, vector calculus, and integral theorems; complex algebra. Prerequisite: Math 32. Second Session: MTWTh 5:45–7:25 pm.

115–10 **Engineering Analysis III** (3)
(Formerly Probabilistic and Statistical Methods in Engineering)
Solution of engineering problems using concepts from probability and sta-

tistics, including random variables, distribution functions, mathematical expectation, point and confidence interval estimation, hypothesis testing, correlation, and regression. This methodology applied to problems of structural design, bioengineering, manufacturing processes, product quality, equipment reliability, engineering management, and societal engineering. Prerequisite: Math 32. A 7-week course, June 2 to July 21: MTh 6:10–8:40 pm.

LECTRICAL ENGINEERING

dministered by the Department of Electrical Engineering and Computer cience, A.C. Meltzer, *Chairman*

VEN-WEEK COURSES—JUNE 2 TO JULY 21

51–10 **Applications of Computers** (3)

Solution of problems on digital computers, using machine language and FORTRAN; data processing concepts, and numerical methods. Writing, debugging, and running programs on a digital computer. MW 6:10–8:40 pm.

153–10 **Design of Switching Systems** (3) (Same as CSci 153)

Introduction to the use and structure of minicomputers and larger computers. Boolean algebra and the design of combinational switching circuits. Number systems, codes, and arithmetic operations in digital computers. Digital computer subsystems and their interconnections. Interfacing equipment to a minicomputer; timing, control, and electronic requirements. Introduction to programming analog computers; analog computer components; analog-to-digital conversion. Prerequisite: CSci or EE 152. TTh 6:10–8:40 pm.

154–10 **Digital Computer Design** (3) (Same as CSci 154)

Logic and electronic design of functional digital units. Design of digital computer subsystems, flow of information and logical flow diagrams in timing and control signals. Design of binary and decimal, serial and parallel digital arithmetic units. Design of memory subsystems, channels, I/0, and storage subsystems. Design of the control unit of a digital computer. Introduction to microprogramming. Design of a small digital computer. Prerequisite: CSci or EE 153 or permission of instructor. May be taken for graduate credit. MW 3:10–5:40 pm.

157–10 **Machine and Assembly Language Programming** (3) (Same as CSci 157)

Machine and assembly language programming for minicomputers and multiprogrammed large computers. Techniques in on-line terminal programming. Methods of addressing and machine control for fixed and variable word length computers. Input-output control and programming for minicomputers. Use of a macro-assembler, subroutine linkages, coroutines, reentrant and recursive routines. Methods of editing and debugging. Characteristics of minicomputer structure. Prerequisite: CSci or EE 51 or equivalent. MW 6:10–8:40 pm.

204–10 **Stochastic Signals and Noise** (3)

Probability, random variables, characteristic functions; transformations of random variables and applications; sequences of random variables, linear mean squared estimation; stationary estimation, stationary random proc-

esses, correlation functions, power spectrum; output of linear systems with stochastic inputs; Gaussian processes. Applications drawn for communications, control theory, computer science. MW 6:10–8:40 pm.

214–10 **Data Structures** (3)

Introduction to discrete structures. Computer data structures; arrays, items, pointers, lists, insertion and deletion, available space management, threaded lists, two-way lists, garbage collection and compactification. Pushdown stacks, strings, and files. Trees and hash table searching; bubble, radix and merge sorting. Sequential, indexed sequential, and random files; access methods; sorting of files. Subroutines, co-routines, macros, flags, relocation and recursion. Buffer and buffer management, data management and storage. List and string processing languages. Prerequisite: CSci 201, or CSci or EE 157. TTh 3:10–5:40 pm.

ENGINEERING ADMINISTRATION

P.A. Crafton, *Chairman*

SEVEN-WEEK COURSES—JUNE 2 TO JULY 21

150–10 **Introduction to Engineering Administration** (3)

(Formerly Introduction to Technical Management)

The interrelationships of engineering, science, and management: conceptual foundations for interaction of human factors in individuals, groups, and the social environment of engineering activities. Familiarization with typical activities of engineering managers and with factors bearing on the motivation of engineers and on engineers as managers. Social and organizational factors relevant to the management of engineers. This course is preliminary to the complete management process studied in EAd 211–12. MW 6:10–8:40 pm.

160–10 **Introduction to Engineering Economic Analysis** (3)

Influence of the time element: interest rates, equivalence, present worth, annual cost, internal rate of return. Incremental analysis. Data for analysis. Characteristics of an accounting system: balance sheet, profit and loss statement, depreciation, allocation of fixed costs, financial statement analysis. TTh 6:10–8:40 pm

170–10 **Basic Quantitative Methods for Engineering Administration** (3)

An introductory treatment of quantitative tools and techniques important in administration, emphasis on their application. Concepts of probability and decision-making in administrative decisions. MW 6:10–8:40 pm.

211–12 **Engineering Administration** (3–3)

Comprehensive and systematic study of the administrative process; industrial, scientific, and engineering environments. Planning: objectives, prediction, policies, plans, and characteristics of plans. Organizing: theory of organization, structure, authority, specialization, delegation, staff and committees. Directing: leadership, managing human and material resources. Controlling: setting standards, evaluating performance, using system feedback data for correction and improvement. Students who receive credit for EAd 211–12 cannot receive credit for EAd 201. EAd 211–10: MW 6:10–8:40 pm; EAd 212–10: TTh 3:10–5:40 pm.

269–10 **Elements of Decision-making and Problem-solving** (3)

History and orientation of quantitative methods; concept of quantitative decision-making; decision criteria under certainty, risk, and uncertainty;

game theory; utility; the time factor; replacement models. Prerequisite: EAd 170 or equivalent. TTh 3:10–5:40 pm.

297–10 **Problems in Engineering Administration** (3)
Project course providing the student with the opportunity to apply the various concepts and tools previously studied to the solution of a problem in engineering administration. Students work individually or in small groups, each on a problem proposed by the student and approved by the instructor. MW 3:10–5:40 pm.

298–10 **Research** (arr.)
Basic or applied research in engineering administration or systems analysis. May be repeated for credit.

300–10 **Thesis Research** (3)
May be taken in Summer Session only with prior written consent of student's thesis adviser. As arranged.

398–10 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. As arranged.

399–10 **Dissertation Research** (arr.)
Limited to Doctor of Science candidates. May be repeated for credit. May be taken in Summer Session only with prior written consent of student's Director of Research. As arranged.

ECHANICAL ENGINEERING

dministered by the Department of Civil, Mechanical, and Environmental gineering, S.W. Yuan, *Chairman*

131–10 **Thermodynamics** (3)
Fundamental thermodynamic concepts, Zeroth law of thermodynamics and temperature measurements, work and heat, first law of thermodynamics, properties of pure substances, first-law analysis of some thermodynamic systems, second law of thermodynamics, reversibility, entropy, second-law analysis of thermodynamic systems. Prerequisite or concurrent registration: ApSc 58. First Session: MTWTh 5:45–7:25 pm.

PERATIONS RESEARCH

H. Marlow, *Chairman*

EN-WEEK COURSES—JUNE 2 TO JULY 21

201–10 **Survey of Operations Research Methods I** (3)
Basic concepts and techniques of operations research as applied to problems in industrial, governmental, and military decision-making. Allocation models including the simplex procedure of linear programming, transportation and assignment models, queuing theory, inventory theory, game theory, and decision-making under uncertainty. Prerequisite: ApSc 115 or equivalent. TTh 3:10–5:40 pm.

202–10 **Survey of Operations Research Methods II** (3)
Simulation, Monte Carlo techniques; networks; integer programming; introduction to nonlinear programming; dynamic programming; reliability and replacement. Prerequisite: OR 201 or equivalent. MW 3:10–5:40 pm.

English

G.E. McCandlish, *Chairman*

Students whose College Board English Composition Achievement Test scores suggest inadequate preparation may be assigned to Engl 9 or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill before placement in either Engl 9 or 10. Students whose scores and/or writing skill indicate superior competence will be allowed to waive Engl 10; those whose scores indicate markedly superior competence will be allowed to waive both Engl 10 and Engl 11 or 12.

The admission of international students to any English course is determined by the English Placement Test for Foreign Students. Students should apply to Undergraduate Admissions, George Washington University, Washington, D.C. 20052, to take this test.

Departmental prerequisite: Engl 9 or 10 is prerequisite to all other courses in English. A 6-semester-hour course in literature, or equivalent, or written permission of the instructor, is prerequisite for admission to all second-group courses in English except Engl 115 and 161–62.

ENGLISH COMPOSITION

2–10 **English for International Students** (0)
(Formerly English for Foreign Students)
Intermediate grammar, reading, and vocabulary review course for international students not yet ready for Engl 3. Total fee, $362.55 (tuition, $282; additional fee, $50; laboratory fee, $17.50; and University Center fee, $13.05). First Session: As arranged.

3 **English for International Students** (0)
(Formerly English for Foreign Students)
Advanced grammar, reading, and vocabulary review course for international students not yet ready for extended writing practice. Total fee, $295.05 (tuition, $282; and University Center fee, $13.05). First Session: Section 10 MTWTh 5:45–7:25 pm; Section 11 MTWTh 11:10 am–12:30 pm.

4–10 **Conversational English for International Students** (0)
Intermediate level course centered on developing conversational fluency via dialogue, idiom drills, and contextuality oriented topics (newspapers, banking, entertainment, etc.). Total fee, $320.05 (tuition, $282; additional fee, $25; and University Center fee, $13.05). First Session: MTWThF 9:40 am–12:30 pm. (Total fee, $100 if taken concurrently with Engl 2 or Engl 3.)

10–10 **English Composition: Language as Communication** (3)
Study and practice of expository techniques; emphasis on the rhetorical complexities of unity, development, organization, and coherence, by analysis of selected current prose; library research procedure. First Session: MTWThF 9:40–11 am.

11–11 **English Composition: Language and the Arts and Sciences** (3)
Study and practice of expository and argumentative techniques; emphasis on the rhetorical complexities of the sentence and of diction, and on logical thought, by analysis of selected readings on the nature of language and

of the arts and sciences. Prerequisite: Engl 9 or 10. Students who receive credit for Engl 11 cannot receive credit for Engl 12. Second Session: MTWThF 9:40–11 am.

12–11 **English Composition: Language in Literature** (3)

Study and practice of expository and argumentative techniques through critical writing; emphasis on the rhetorical complexities of stylistics in the sentence and in diction, and on logical thought, by the study of literary genres and of the use of language in literature. Prerequisite: Engl 9 or 10. Students who receive credit for Engl 12 cannot receive credit for Engl 11. Second Session: MTWThF 9:40–11 am.

NGLISH LITERATURE

51–52 **Introduction to English Literature** (3–3)

Representative works by major authors, studied in their historical context; discussion of recurrent themes, and introduction to various types and forms of imaginative literature. First Session: Engl 51–10. Second Session: Engl 52–11. MTWTh 5:45–7:25 pm.

108–10 **Advanced Writing—Poetry and Prose** (3)

Prerequisite: Engl 9 or 10; 11 or 12; consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing. First Session: MTWTh 7:35–9:15 pm.

114–11 **The Folktale** (3)

A study of the folktale as narrative art, its structure, devices, content, appeal, purposes and relation to other literary genres. Second Session: MTWThF 4:10–5:30 pm.

121–11 **Practical Criticism** (3)

Consideration of various uses of language and complex shapes of thought in literature; introduction to mature study and full enjoyment of poetry, fiction, and drama. Second Session: MTWTh 5:45–7:25 pm.

145–10 **Special Topics in English Literature** (3)

Topic for summer: the English essay from Bacon to Eliot. First Session: MTWThF 9:40–11 am.

146–10 **Special Topics in English Literature** (3)

Classicism in England: the course of Renaissance tradition in English literature—readings from Sidney, Jonson, Milton, Dryden, Pope, Johnson. First Session: MTWThF 1:10–2:30 pm.

147–10 **Special Topics in English Literature** (3)

The Literary Avant-Garde, 1906–1946. First Session: MTWThF 4:10–5:30 pm.

148–10 **Special Topics in English Literature** (3)

Hardy and Lawrence: continuities and new directions in poetry, novels, and criticism. First Session: MTWTh 7:35–9:15 pm.

157–11 **20th Century Drama** (3)

Representative continental, English, and American plays of the 20th century. Second Session: MTWThF 1:10–2:30 pm.

*245–11 **Seminar** (3)
Modern poetry and the tradition. Second Session: TTh 8:10–10 pm.

AMERICAN LITERATURE

71–72 **Introduction to American Literature** (3–3)
Historical survey. Engl 71: from beginnings to the Civil War. Engl 72: from the Civil War to present. First Session: Engl 71–10; Second Session: Engl 72–11. MTWThF 9:40–11 am.

164–10 **Major American Poets** (3)
Advanced critical study of significant writers and movements in the 20th century. First Session: MTWThF 11:10 am–12:30 pm.

166–11 **American Drama** (3)
Historical and critical study of significant plays and forms since 1930. Second Session: MTWTh 5:45–7:25 pm.

173–74 **Selected Literary Movements** (3–3)
First Session, Section 10, Literature of the Thirties. MTWThF 1:10–2:30 pm. Second Session, Section 11, *The New Yorker*, 1925–1975, as arbiter of taste and as innovator, a study in literary influence. MTWThF 4:10–5:30 pm.

176–10 **Special Topics in American Literature** (3)
Transcendental Evil: the pessimistic strain in the American Romantic movement. First Session: MTWThF 9:40–11 am.

177–78 **Contemporary American Literature** (3–3)
Major and representative works since World War II. First Session: Engl 177–10 MTWTh 5:45–7:25 pm. Second Session: Engl 178–11 MTWThF 11:10 am–12:30 pm.

*286–11 **Seminar: American Literature, 1865–1900** (3)
Howells, Henry James, and Henry Adams. Second Session: TTh 4:30–6:30 pm.

Experimental Humanities

Administered by the Division of Experimental Programs, C.C. Mondale, *Director*

154 **Independent Study** (3)
Field work combined with academic study, involving field-placements (12–30 hours per week) and complementary academic program of study, under the supervision of appropriate faculty member. Students must "contract" with the agency, the faculty member, and the Service-Learning Program. Admission by permission of instructor. First Session: Hum 154–10; Second Session: Hum 154–11. As arranged.

* An 8-week course, June 30 to August 22.

Forensic Sciences

J.C. Allen, *Chairman*

203–10 **Examination of Questioned Documents** (3)

Theory and principles of handwriting and handprinting, duplicating processes, paper manufacture and fiber analysis; studies of paper and methods of examination of questioned documents. First Session: TTh 6:10–8 pm.

220–11 **The Crime Lab, the Forensic Scientist, and the Criminal Lawyer** (3)

Survey of the forensic physical sciences; qualifications and preparation of the expert witness and his role in court in criminal and civil cases; operation and function of the crime lab. Second Session: MW 6:10–8 pm.

224–10 **Introduction to Criminal Law, Procedure, Evidence, and Legal Methods** (3)

Principles of criminal law and procedure, preparation and presentation of evidence, examination of witnesses, and the methods of legal research. First Session: MW 4:10–6 pm.

225–11 **Advanced Criminal Evidence** (3)

Study of procedural rules affecting the collection and use of physical evidence, with emphasis on court opinions defining the rules of search and seizure and admissibility of evidence. Prerequisite: ForS 224 or equivalent experience. Second Session: TTh 6:10–8 pm.

228–10 **Administration of Criminal Justice** (3)

Consideration and analysis of selected advanced problems in the administration of criminal justice. Emphasis on the role and professional responsibilities of prosecutor and defense counsel and on developmental trends in the law. Prerequisite: ForS 224 or equivalent experience. First Session: MW 4:10–6 pm.

229–10 **The Police and the Community** (3)

Problems and potential of contemporary urban law enforcement; the role and perspective of the police officer. First Session: MW 6:10–8 pm.

261–10 **Introduction to Forensic Pathology** (3)

Terminology and scientific techniques used in medicolegal investigations, sudden or unexpected deaths, homicides, suicides, accidental deaths, and trauma. First Session: TTh 6:10–8 pm.

268–11 **Photography in the Forensic Sciences** (3)

Basic use of forensic photography, including selection and use of equipment, photographs as evidence, close-up work, and common misconceptions. Second Session: MW 6:10–8 pm.

295 **Research** (arr.)

Open to qualified Master's degree students. Research on problems, approved by the Chairman of the Department or academic adviser, under

also be taken through the National Law Center, with permission of the Dean of the National Center.

the supervision of an appropriate staff member. First Session: Section 10; Second Session: Section 11.

298 **Forensic Sciences Practicum** (arr.)
Open to qualified Master's degree students. Internship experience in a crime lab or criminal justice agency, under supervision of an appropriate staff member. First Session: Section 10; Second Session: Section 11. As arranged.

299–300 **Thesis Research** (3–3)
ForS 299–10 and 300–10: both sessions.

French

Administered by the Department of Romance Languages and Literatures, J.F. Burks, *Chairman*

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

Departmental prerequisite: Fren 3–4 or 6, or equivalent, is prerequisite to all second-group courses in French.

1–2 **First-year French** (3–3)
A year course: credit toward a degree at this University given on completion of Fren 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern French prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a session. First Session: Fren 1–10; Second Session: Fren 2–11. Classroom—MTW ThF 9:40–11 am, laboratory—MTh 11:10–12 am.

3–4 **Second-year French** (3–3)
A year course: credit toward a degree at this University given on completion of Fren 4. Conversation, grammar, composition, reading in modern French prose, introduction to French civilization. Aural training, oral practice in language laboratory. Prerequisite: Fren 1–2 or two years of high school French. Laboratory fee, $17.50 a session. First Session: Fren 3–10; Second Session: Fren 4–11. Classroom—MTWThF 11:10 am–12:30 pm, laboratory—MTh 10:10–11 am.

9–10 **Expression Orale du Français Contemporain** (3)
Emphasis on conversation in a controlled situation. Special attention to the acquisition and active use of a flexible vocabulary. Oral reports. Prerequisite: Fren 4 or equivalent. First Session: MTWThF 9:40–11 am.

10–11 **Cours de Syntaxe** (3)
Grammar, writing of exercises, compositions, and translation. Analysis of vocabulary and syntax and their effects in samples of writing. Prerequisite: Fren 4 or equivalent. Second Session: MTWThF 9:40–11 am.

49–10 **French for Graduate Students** (0)

For graduate students preparing for reading examinations. No academic credit. Tuition: total fee, $295.05 (tuition, $282; University Center fee, $13.05). First Session: MTWThF 6–7:20 pm.

133–10 **Summer Seminar: French Literature** (3)

Topic for summer: Contemporary trends in French theatre. Evolution of dramatic modes in France beginning with the new theatre of Beckett, Genet, and Ionesco; comparison of French theatrical innovation with concomitant changes in the theatre in Germany, England, and the United States. Lectures in English. French plays may be read in translation by non-French majors. May be repeated for credit. First Session: MTW ThF 4:10–5:30 pm.

eography and Regional Science

F. Gordon, *Chairman*

51–10 **Introduction to Geography** (3)

General survey of the systematic fields of human geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts. First Session: MTWThF 9:40–11 am.

52–11 **Introduction to Economic Geography** (3)

Examination of the basic principles which determine the location of economic activities on the surface of the earth. Second Session: MTW ThF 9:40–11 am.

140–11 **Urban Geography** (3)

Analysis of the internal spatial structure of cities; emphasis on explaining patterns of location within the city. Second Session: MTWThF 11:10 am–12:30 pm.

43–10 **Social Geography** (3)

Consideration of behavioral aspects of geography incorporating spatial cognition, spatial behavior, social space, migration processes, and conflicts in spatial decision-making. First Session: MTWThF 11:10 am–12:30 pm.

83–10 **Europe** (3)

Survey of the physical and cultural regional patterns of Europe. First Session: MTWThF 9:40–11 am.

89–90 **Readings in Geography** (arr.)

First Session: Geog 189–10 and 190–10; Second Session: Geog 189–11 and 190–11.

5–10 **Field Methods in Cultural Ecology: Settlement Patterns in Pre-Columbian Mesoamerica** (3 or 6)

June 2 to June 30. (See Field Program in Pre-Columbian Cultural Ecology, pages 40–41.)

295 **Research** (arr.)
May be repeated once for credit. First Session: Section 10; Second Session: Section 11.

299–300 **Thesis Research** (3–3)
Geog 299–10 and 300–10: both sessions.

For information concerning the Field Program in Pre-Columbian Cultural Ecology, see pages 40–41.

Geology

Geza Teleki, *Chairman*

1–2 **Introductory Geology for Nonscience Majors** (3–3)
(Formerly Introductory Geology)
Survey covering the principles of geology; emphasis on man's effect on the environment. Laboratory fee, $15 each session. First Session: Geol 1–10; Second Session: Geol 2–11. MTWTh 9:40–12 am.

5 **Environmental Geology** (3)
The relation of man and society to natural environment: population evolution and resources; economic, legal, and political aspects. Laboratory fee, $15. First Session: Geol 5–10 MTWTh 9:40–12 am. Second Session: Geol 5–11 TWTh 10 am–1:30 pm.

199 **Undergraduate Research** (arr.)
Problems approved by the staff. May be repeated once for credit. First Session: Section 10; Second Session: Section 11. As arranged.

295 **Research** (arr.)
Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit. First Session: Section 10; Second Session: Section 11.

299–300 **Thesis Research** (3–3)
First Session: Geol 299–10; Second Session: Geol 300–10. As arranged.

398–10 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399–10 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

ermanic Languages and Literatures

tri Steiner, *Chairman*

lacement Examination: A student who has not been granted advanced stand-g and who wishes to continue in college the language begun in high school ust take a placement examination before registration. Upon completion of e examination, assignment is made to the appropriate course.

1–2 **First-year German** (3–3)

Fundamental concepts of German culture, essentials of German structure and basic vocabulary, reading of easy prose and conversation. Aural-oral practice in language laboratory. Prerequisite to Germ 2: Germ 1 or equivalent. Laboratory fee, $17.50 each session. First Session: Germ 1–10; Second Session: Germ 2–11. Classroom: MTWTh 5:45–7:25 pm. Laboratory: Section 30—MW 4:45–5:35 pm; Section 31—MW 7:35–8:25 pm.

3–4 **Second-year German** (3–3)

Introduction to German civilization, selections from modern German prose, continuation and review of German structure, conversation and simple composition. Aural-oral practice in language laboratory. Prerequisite to Germ 3: Germ 2 or equivalent. Prerequisite to Germ 4: Germ 3 or equivalent. Laboratory fee, $17.50 each session. First Session: Germ 3–10; Second Session: Germ 4–11. Classroom: MTWTh 7:35–9:15 pm. Laboratory: Section 32—MW 4:45–5:35 pm; Section 33— MW 6:30–7:20 pm.

47–10 **Beginning German for Reading Acquisition** (3)

For undergraduates and graduate students with little or no German who are interested in acquiring a reading knowledge of German. No academic credit for graduate students. First Session: MTWTh 5:45–7:25 pm.

9–11 **German Readings for Nonmajor Students** (3)

Primarily for graduate students preparing for reading examinations; undergraduates admitted. No academic credit for graduate students. Prerequisite: Germ 4 or 47, or equivalent. Second Session: MTWTh 5:45–7:25 pm.

lth Care Administration

Gintzig, *Chairman*

–11 **Personnel Relations in Health Care Institutions** (3)

Introduction to personnel relations in the health care environment. Research studies, as they pertain to the concepts of leadership and superior-subordinate relations in a multidisciplinary organization, evaluated for practical application. Emphasis on employee cooperation, differences in ability and background, and problems caused by specific working conditions. August 12 through November 15: As arranged.

d to students in the Bachelor of Science in Health Care Administration degree program aval School of Hospital Administration, Bethesda, Md.

*153–10 **Survey of Health Care Organization** (3)
Introduction to the organization and delivery of health care services in the United States. Emphasis on the structural features of and the resources available to the health care system. First Session: TW 3–5 pm.

204–10 **Management of Health Maintenance Organizations** (3)
Basic principles and fundamentals of prepaid group practice plans and newly forming health maintenance organizations. Emphasis on planning, development, and operation of prepaid plans. June 2 through August 15: W 1–3 pm.

210–10 **Advanced Health Resources Management** (3)
(Formerly Advanced Financial Management of Health Care Institutions)
Development of financial health policies, objectives, and programs. Application of PPBS in the health care field; financial management of multi-unit health care systems; financial aspects of national health programs, prospective rates and regulation of health prices; case studies and field research. Prerequisite: HCA 209. June 2 through August 15: T 3–5 pm.

270–10 **Research in Health Care Administration** (3)
Field research. Primarily for doctoral students; open to other graduate students with consent of instructor. May be repeated for credit. June 2 through August 15.

285–10 **Readings in Health Care Administration** (3)
Supervised readings in special areas or subdivisions of health care administration and planning. Primarily for doctoral students; open to other students by arrangement. June 2 through August 15.

287–10 **Seminar: Health Care Administration and the Law** (3)
First Session: As arranged.

288–10 **Seminar: Field Problem Studies in Health Care Administration** (3)
Selected administrative and planning issues and problems arising in health care facility situations. Primarily for doctoral students; open to other students by arrangement. May be repeated for credit. June 2 through August 15.

293 **Residency I** (3)
First third of the 12-month residency. Work experience under a qualified preceptor, periodic written progress reports, and a written major report. Sections 10, 11, 12, and 13. June 2 through August 15.

296–10 **Residency II** (3)
First third of 12-month residency. For selected students who take a second year of residency. June 2 through August 15.

---

* A special selection of this course, HCA 153–11, for students in the Bachelor of Science in Health Care Administration degree program at the Naval School of Hospital Administration, Bethesda, Md., will be offered August 12 through November 15; hours to be arranged.

Health Care Sciences*

arrett Wise, *Director of the Physician's Assistant Program*

IRST SESSION—JUNE 2 TO JULY 9

146–10 **Animal Surgery** (3)

147–10 **Introduction to Radiology** (2)

148–10 **Introduction to Electrocardiography** (2)

149–10 **Introduction to Surgery** (2)

150–10 **History-taking Review and Theory** (0)

151–10 **Clinical Pharmacology** (2)

152–10 **Introduction to Basic Laboratory Medicine** (4)

160–10 **Medical Inpatient** (4)

163–10 **Medical Outpatient** (4)

166–10 **Surgical Inpatient** (4)

169–10 **Obstetrics and Gynecology** (4)

172–10 **Pediatric Outpatient** (4)

175–10 **Primary Care Preceptorship** (12)

178–10 **Emergency Medicine** (4)

198–10 **Psychiatric Outpatient** (4)

199–10 **Independent Study** (4)

istory

W. Kenny, *Chairman*

partmental prerequisite: Students are expected to bring to second-group rses an appropriate level of background preparation. Ordinarily, this is ieved by successful completion of first-group courses in the same area or by senting evidence of equivalent preparation. Students lacking such prepara- may take second-group courses only with the consent of the instructor.

39–40 **European Civilization in Its World Context** (3–3)

Hist 39: political, social, economic, and cultural history to early modern era. Hist 40: from early modern era to present. First Session: Hist 39–10—MTWThF 8:10–9:30 am; Second Session: Hist 40–11—MTWThF 9:40–11 am.

*rollment limited to students in the Physician's Assistant program in the School of Medicine Health Services. Days and hours to be arranged.

71–72 **Introduction to American History** (3–3)
Hist 71: political, social, economic, and cultural forces of the United States in their world setting from 1620 to 1876. Hist 72: from 1876 to present. First Session: Hist 71–10; Second Session: Hist 72–11. MTW ThF 11:10 am–12:30 pm.

107–10 **The Hellenistic World** (3)
338–62 B.C. Developments in Greece and the Near East from the Macedonian conquest to the eve of the Roman conquest. First Session: MTWThF 1:10–2:30 pm.

121–11 **The Renaissance in Western Europe** (3)
The Renaissance City, concepts of the ideal man and woman, the discovery of new worlds, Machiavelli, historiography of the period. Second Session: MTWThF 11:10 am–12:30 pm.

139–10 **World History in the Twentieth Century** (3)
Diplomatic, political, and cultural factors from the turn of the century to the Munich settlement of 1938. First Session: MTWThF 9:40–11 am.

142–10 **History of France** (3)
Political, social, and cultural development from Napoleon to present. First Session: MTWThF 9:40–11 am.

145–11 **Imperial Russia** (3)
(Formerly History of Russia: 18th and 19th Centuries)
Second Session: MTWThF 9:40–11 am. (See Russian-East Asian Studies program, pages 43–44.)

147–10 **Economic History of Europe** (3)
Economic development since the Middle Ages; emphasis on the period following the Industrial Revolution. Evolution of capitalism and its impact upon the societies of Europe. First Session: MTWThF 1:10–2:30 pm.

150–10 **European Diplomatic History** (3)
Emphasis on policies and actions of the great powers and their statesmen since 1890. Students who receive credit for Hist 150 cannot receive credit for Hist 157. First Session: MTWThF 11:10 am–12:30 pm.

164–11 **History of Latin America** (3)
Political, socioeconomic, and cultural development in the national period. Second Session: MTWThF 1:10–2:30 pm.

178–10 **Recent U.S. History** (3)
Political, social, and intellectual history from 1890 to present. First Session: MTWThF 11:10 am–12:30 pm.

182–10 **U.S. Diplomatic History** (3)
Survey of American foreign relations in the 20th century. First Session: MTWThF 8:10–9:30 am.

187–11 **History of Modern China** (3)
Second Session: MTWThF 1:10–2:30 pm. (See Russian-East Asian Studies program, pages 43–44.)

188–10 **History of Chinese Communism** (3) Thornton
First Session: MTWThF 4:10–5:30 pm. (See Russian-East Asian Studies program, pages 43–44.)

203–4 **Research Seminar** (3–3)
Prerequisite: approval of Department. First Session: 203–10; Second Session: 204–11. As arranged.

214–10 **Evolution of the Socialist Commonwealth** (3) Petrov
First Session: MW 6:10–8 pm. (See Russian-East Asian Studies program, pages 43–44.)

225–26 **History of Washington, D.C.** (3–3)
First Session: Section 10; Second Session: Section 11. TTh 6:10–8 pm; field trips as arranged. (See Capital City Historical Seminar, page 39.)

237–10 **Seminar: Soviet Foreign Policy, 1917–1960** (3)
First Session: TTh 6:10–8 pm. (See Russian-East Asian Studies program, pages 43–44.)

99–300 **Thesis Research** (3–3)
Hist 299–10 and 300–10: both sessions.

388–10 **Readings in the History of Sino-Soviet Relations** (3)
First Session: MW 6:10–8 pm. (See Russian-East Asian Studies program, pages 43–44.)

396–10 **Readings in Modern Far Eastern History** (3) Johnson
First Session: As arranged. (See Russian-East Asian Studies program, pages 43–44.)

398–10 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399–10 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

For information concerning the Capital City Historical Seminar and the special program in Russian-East Asian Studies, see pages 39, 43–44.

man Kinetics and Leisure Studies

Breen, *Chairman*

University is not responsible for injuries received in intramural games, or y of the activities of the Department of Human Kinetics and Leisure es; the student assumes full responsibility therefor.

118 **Special Problems in Dance Composition** (1)
Work with elements of movement leading to short composition studies. Section 10 and Section 11: June 2 to 20—MTWThF 11:30 am–1 pm. (See Dance Workshop, pages 39–40.)

120 **Repertory** (1 or 2)
Creation of a new work to be performed in concert at the end of the workshop. By audition. Section 10 and Section 11: June 2 to 20—2–3:30 pm.

121 **Dance Technique I** (1)
Intermediate/advanced modern dance technique. May be repeated once for credit. Section 10 and Section 11: June 2 to 20—9:30–11 am. (See Dance Workshop, pages 39–40.)

184–10 **Workshop in Human Kinetics and Leisure Studies** (3)
May 14 to June 4: MTWThF 5–9 pm; field activities MTS mornings. Field Study Project: May 23 to June 4. As arranged.

280–10 **Advanced Workshop** (3)
Topic for Summer: Tourism, Leisure, and Park Planning. Exploration in problems in planning for tourism and leisure programs suited to both needs and interests of people; development of facilities that will permit the operation of these programs. A 6-week course, June 16 to July 25: MW 8–10 pm; project as arranged.

283–10 **Supervised Experience in Physical Education, Recreation, or Dance** (3)
Field work, internship and/or instructional practice, including conference and/or seminar. May be repeated once for credit with permission of adviser. A 6-week course, June 16 to July 25: as arranged.

296–10 **A Systems Approach to Leisure and Park Resource Development** (3)
Comprehensive planning, human resource development, and program facility design, using systems approaches. A 6-week course, June 16 to July 25: MW 6–8 pm; project as arranged.

297–10 **Advanced Topical Studies** (3)
Independent research and study pertinent to the needs of the student. Prerequisite: Educ 295 or permission of instructor. May be repeated once for credit with permission of the adviser. A 6-week course, June 16 to July 25: as arranged.

For information concerning workshops in Dance and Movement Education, see pages 39–40, 42.

Institute for Sino-Soviet Studies

For information concerning the Russian-East Asian Studies program, see pages 43–44.

Journalism

Philip Robbins, *Chairman*

72–10 **Introduction to Mass Communication** (3)
Mass media, problems of contemporary journalism, emphasis on media-government relations. First Session: MTWThF 9:40–11 am.

111–10 **Reporting** (3)

Gathering, evaluating, and writing news. Some typing required. Laboratory fee, $5. First Session: MTWThF 9:40–11 am

150–10 **News Coverage in Washington** (3)

The Washington news beats, channels and sources of news in the nation's capital, uses and abuses of the media. Field trips to local news centers and press briefings. Guest lecturers from the Washington press corps. First Session: MTWThF 11:10 am–12:30 pm.

160–10 **The New Journalism** (3)

First Session: MTWThF 11:10 am–12:30 pm. (See The New Journalism program, pages 42–43.)

190–10 **Internship in Journalism** (3)

Study of a journalistic medium in action by assignment to a Washington area news office. Admission restricted to Journalism majors selected by a departmental committee. First Session: As arranged.

196–10 **Senior Project** (3)

Open only to Journalism majors. Major journalistic effort undertaken in consultation with a member of the Journalism staff. A written request describing the project must be presented to the staff member for approval, and filed with the student's adviser in the semester before registration. First Session: As arranged.

For information concerning The New Journalism program, see pages 42–43.

t of courses to be offered during the summer of 1975 at the National Law er will be available in a Law Center announcement scheduled to be issued g January 1975. Copies of this announcement may be obtained from the nal Law Center.

agement Science

Winslow, *Chairman*

3–10 **Introduction to Information Processing** (3)

Basic principles, terminology, and methods of computer data processing. Introduction to the use of the computer as a tool through homework assignments illustrating typical problems encountered in business and government data processing. Assignments involve flow charting and computer programming in a higher level language (FORTRAN) and are run on the University's computer and on the School's computer terminals. Laboratory fee, $25. First Session: MTWTh 4:10–5:50 pm.

119–10 **Computer Programming for Information Systems** (3)

COBOL programming for business and government data processing applications. For students already familiar with basic computer concepts, flow charting, and programming. Emphasis on practical computer applications in accounting and management information systems. Prerequisite: Mgt 118 or Stat 97. Laboratory fee, $25. First Session: MTWTh 4:10–5:50 pm.

*201 **Advanced Administrative Management** (3)

Principles and practices common to administrative units of all kinds. First Session: Section 10—MWF 6:10–8 pm; Section 11—MWTh 4:10–6 pm; Section 12—TTh 6:10–9 pm. Second Session: Section 13—MWF 2:10–4 pm; Section 14—MWF 6:10–8 pm; Section 15—As arranged.

203–10 **Mathematics for Management** (3)

Mathematical concepts employed in the solution of management problems. Applications of analytical geometry, functions, elements of calculus, and linear algebra to optimization problems. Prerequisite: algebra. First Session: MWF 4:10–6 pm.

204 **Quantitative Factors in Administration** (3)

Survey of quantitative techniques used in the solution of management problems. Potentials and limitations of mathematical models and proper areas for their application. Topics include probability, statistical decision theory, linear programming, waiting line, inventory replacement models. First Session: Section 10—MWF 10:10–12 am; Section 11—TTh 5:10–8 pm. Second Session: Section 12—TTh 6:10–9 pm.

207 **Human Behavior in Organizations** (3)

Individual, group, intergroup, and other human behavior and development; application of social science research to administration. Learning exercises and practical applications emphasized. First Session: Section 10—TTh 6:10–9 pm; Section 11—MWF 4:10–6 pm; Section 12—TTh 5:10–8 pm. Second Session: Section 13—MWF 4:10–6 pm; Section 14—TTh 6:10–9 pm.

210–10 **Behavioral Factors in the Process of Change** (3)

Review of current research, theory, and practice related to the process of change. Basic principles of planned change; individual, group, organization, community, and cultural change. Emphasis on human behavior research and theory related to the change process. Prerequisite: Mgt 207 or permission of instructor. First Session: MWF 4:10–6 pm.

225–10 **Managerial Statistics I** (3)

The mathematics of probability and statistics and its applications in management science and operations research. Topics include random variables; discrete and continuous probability distributions; moments and other descriptive measures; sampling theory; and an introduction to statistical estimation, hypothesis testing. Prerequisite: Mgt 203 or equivalent. First Session: MWF 6:10–8 pm.

226–11 **Managerial Statistics II** (3)

Management applications of the theory and techniques of mathematical statistics. Topics include maximum likelihood and other methods of esti-

* A special section of this course, Mgt 201–15, for students in the Navy Graduate Financial Management Program, will be offered May 27 to July 15.

mation, hypothesis testing, descriptive measures of bivariate distributions, regression and correlation, analysis of time series, econometric models and multiple regression, statistical decision theory, and the revision of probabilities in decision-making. Prerequisite: Mgt 225. Second Session: MWF 6:10–8 pm.

240–10 **Survey of Information Technology** (3)

A management-oriented presentation of the vocabulary, concepts, and trends in computer hardware and software, information systems design and development, organizational impact, and effective management; milestones of past and current research; computer technology as a rapidly evolving force of major significance in business, government, and industry. Designed for students without prior information technology experience who do not plan to take additional information technology courses. First Session: MWF 6:10–8 pm.

241–10 **Management Information Systems Development and Application** (3)

For students in the Navy Graduate Financial Management Program only. Contemporary theories and practices in the development of management information systems. Participation in the design of information systems specifications. The roles of both management and systems design personnel in the systems development process studied and evaluated. Impact of management information systems upon the organization and its decision-making processes evaluated. Case studies. Prerequisite: an introductory course in information technology, or permission of instructor. First Session: MWF 8:10–10 pm.

246 **Survey of Information Technology: Laboratory** (3)

A one-semester course providing a practical orientation to computer hardware and software through laboratory and discussion sessions. On-line and batch programming and interactive problem solving including use of software packages. Laboratory sessions conducted primarily on the School's minicomputer via remote and local terminals. Laboratory fee, $25. First Session: TTh 6:10–9 pm.

9–10 **Seminar: Information Technology** (3)

Current problems in the design and implementation of computer-based systems; emphasis on current state-of-the-art through discussion with leading experts in the field, analysis of literature. Prerequisite: Mgt 241, 242, 243; or permission of instructor. First Session: MWF 8:10–10 pm.

hematics

. Liverman, *Chairman*

–10 **College Algebra** (3)

Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry. First Session: MTWThF 7:35–8:55 pm.

–11 **Plane Trigonometry** (3)

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor). Second Session: MTWThF 6–7:20 pm.

9 **General Mathematics I** (3)
For students electing Math 9 and 10 as a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics. First Session: Section 10—MTWThF 8:10–9:30 am. Second Session: Section 11—MTWThF 4:10–5:30 pm.

10–11 **General Mathematics II** (3)
Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9. Second Session: MTWThF 8:10–9:30 am.

30 **Precalculus** (3)
Set theory inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students must take a placement examination in algebra and trigonometry. First Session: Section 10—MTWThF 7:35–8:55 pm. Second Session: Section 11—MTWThF 9:40–11 am.

31 **Calculus of One Variable** (3)
Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent.* First Session: Section 10—MTWThF 9:40–11 am. Second Session: Section 11—MTWThF 7:35–8:55 pm.

32–11 **Calculus of Several Variables** (3)
Vectors, determinants, partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31. Second Session: MTWThF 9:40–11 am.

33–11 **Calculus of Vector Functions** (3)
Curves, differential equations, infinite series, vector calculus, line integrals, Green and Stokes theorems. Prerequisite: Math 32. Second Session: MTWThF 6–7:20 pm.

†51–10 **Mathematics for the Social and Management Sciences I** (3)
Notion of function, graph of function; sequences; differential calculus of functions of one variable; exponential and logarithmic functions. New students must take a placement examination in algebra prior to registration. First Session: MTWThF 6–7:20 pm.

†52–11 **Mathematics for the Social and Management Sciences II** (3)
Integral calculus of functions of one variable; functions of several variables; partial derivatives, maxima and minima, Lagrange multipliers; systems of linear equations and inequalities; matrix algebra, determinants; rudiments of linear programming. Prerequisite: Math 51. Second Session: MTWThF 6–7:20 pm.

111–10 **Mathematics for Engineers and Physicists I** (3)
Linear differential equations, linear algebra, Fourier series and integral, nonlinear differential equations of the first order. Prerequisite: Math 32. First Session: MTWThF 7:35–8:55 pm.

---

* Math 30 may be waived as a prerequisite requirement by examination on scheduled dates.
† Social and Management Science students with a strong record in high school mathematics are advised to take Math 31, 32, and 124 instead of Math 51 and 52.

112–11 **Mathematics for Engineers and Physicists II** (3)

Ordinary differential equations, systems of differential equations, boundary-value problems, partial differential equations. Prerequisite: Math 111. Second Session: MTWThF 6–7:20 pm.

124–10 **Introduction to Matrix Theory** (3)

Operations on matrices, linear equations, matrix inversion, vector spaces, characteristic roots and vectors. Hamilton-Cayley theorem. Systems of linear difference and differential equations. Quadratic forms. Prerequisite: Math 32 or permission of instructor. First Session: MTWTh 5:45–7:25 pm.

139–10 **Advanced Calculus I** (3)

Review and extension of elementary one-variable calculus, emphasis on the theoretical foundations; differential calculus of several variables. Prerequisite: Math 33. First Session: MTWThF 6–7:20 pm.

140–11 **Advanced Calculus II** (3)

Differential and integral calculus of several variables; contraction maps, implicit function and differential equation theorems. Prerequisite: Math 139 or equivalent. Second Session: MTWThF 6–7:20 pm.

163–11 **Advanced Calculus for Teachers** (3)

Rigorous re-examination of one-variable calculus, emphasis on limit, continuity, differentiability, Riemann integration. Prerequisite: Math 160 or permission of instructor. Second Session: MTWTh 5:45–7:25 pm.

166–11 **Introduction to Graph Theory for Teachers** (3)

Graph theory with applications to Markov chains (probability), programming, economics, psychology, biology, and puzzles. Prerequisite: Math 31 or equivalent. Second Session: MTWTh 5:45–7:25 pm.

195–11 **Reading and Research** (3)

May be repeated once for credit. First Session: Section 10; Second Session: Section 11.

-300 **Thesis Research** (3–3)

Math 299–10 and 300–10: both sessions.

8–10 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

9–10 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

hanical Engineering

Engineering and Applied Science."

nly to candidates for the degree of Master of Science for Teachers, teachers for in-service or students recommended by the Department of Education.

Music

George Steiner, *Chairman*

MUSIC HISTORY AND LITERATURE

3 Introduction to Musical Understanding (3)
Introductory history of musical styles, related to listening; elements and materials of music. First Session: Section 10—MTWThF 9:40–11 am; Second Session: Section 11—MTWTh 5:45–7:25 pm.

8–10 History of Jazz (3)
Introduction to the styles, composers, and performers of jazz music from its origins to the present. First Session: MTWThF 1:10–2:30 pm.

105–11 Music of the Baroque Period (3)
Study of the musical styles, techniques, and literature from 1600 to 1750. Second Session: MTWThF 1:10–2:30 pm.

MUSIC THEORY

5–6 Harmony (3–3)
Triads, inversions; chord analysis, construction, and progression; part-writing, modulations, altered chords. Prerequisite: Mus 1 or satisfactory passing of placement examination. First Session: Mus 5–10; Second Session: Mus 6–11. MTWThF 4:10–5:30 pm.

APPLIED MUSIC

Applied Music courses listed below are offered in both sessions and may be repeated for credit. Each course has individual lessons of 45 minutes twice a week; supplementary fee, $40.

11 Piano (1)
First Session: Section 10; Second Session: Section 11.

13 Voice (1)
First Session: Section 10; Second Session: Section 11.

15 Organ (1)
First Session: Section 10; Second Session: Section 11.

17 Violin (1)
First Session: Section 10; Second Session: Section 11.

19 Classical Guitar (1)
First Session: Section 10; Second Session: Section 11.

21 Viola (1)
First Session: Section 10; Second Session: Section 11.

23 **Cello** (1)
First Session: Section 10; Second Session: Section 11.

25 **Bass** (1)
First Session: Section 10; Second Session: Section 11.

27 **Flute** (1)
First Session: Section 10; Second Session: Section 11.

29 **Recorder** (1)
First Session: Section 10; Second Session: Section 11.

31 **Oboe** (1)
First Session: Section 10; Second Session: Section 11.

33 **Clarinet** (1)
First Session: Section 10; Second Session: Section 11.

35 **Saxophone** (1)
First Session: Section 10; Second Session: Section 11.

37 **Bassoon** (1)
First Session: Section 10; Second Session: Section 11.

39 **French Horn** (1)
First Session: Section 10; Second Session: Section 11.

41 **Trumpet** (1)
First Session: Section 10; Second Session: Section 11.

43 **Trombone** (1)
First Session: Section 10; Second Session: Section 11.

45 **Percussion** (1)
First Session: Section 10; Second Session: Section 11.

47 **Harp** (1)
First Session: Section 10; Second Session: Section 11.

111 **Piano** (1)
First Session: Section 10; Second Session: Section 11.

113 **Voice** (1)
First Session: Section 10; Second Session: Section 11.

115 **Organ** (1)
First Session: Section 10; Second Session: Section 11.

117 **Orchestral Instrument** (1)
First Session: Section 10; Second Session: Section 11.

119 **Classical Guitar** (1)
First Session: Section 10; Second Session: Section 11.

rations Research

Engineering and Applied Science."

Philosophy

Thelma Z. Lavine, *Chairman*

50–10 Introduction to Philosophy (3)
Readings from major philosophers and of philosophic positions from Plato to the present. First Session: MTWThF 9:40–11 am.

71–10 Philosophy and Literature (3)
Philosophical foundations of psychoanalytical psychiatry, existentialism, and Marxism and their expression in literature, e.g., in the works of Mann, Kafka, Camus, Sartre, Hesse, and Koestler. First Session: MTWThF 11:10 am–12:30 pm.

153–10 Reason and Imagination in Science, Art, and Philosophy (3)
Comparison of the various roles of reason and imagination in scientific inquiry, artistic creativity, and philosophic speculation. First Session: MTWThF 1:10–2:30 pm.

163–11 Philosophy and the Film (3)
Examination of aesthetic theories in relation to the film as most familiar and most powerful of 20th century art forms. Readings in aesthetic theory and film criticism. Viewing and critique of about eight films. Second Session: MTWThF 9:40–11 am.

173–11 Ideas of America: Two Centuries of Dreams and Realities (3)
The meaning of "America" as ideal and as actuality from Jefferson to the Bicentennial. Second Session: MTWThF 8:10–9:30 am.

Physics

H.H. Hobbs, *Chairman*

1–10 Foundations of Physics (4)
(Formerly General Physics)
Development of conceptual principles underlying modern physical knowledge; basics of mechanics, heat, and electromagnetism, including the classical concepts of energy, momentum, heat, temperature, entropy, electric and magnetic fields, optics. Prerequisite: two years of college preparatory mathematics or concurrent registration for Math 6. Laboratory fee, $11. First Session: lecture MTTh 1:10–3 pm. Section 30: recitation WF 8:10–9:30 am and laboratory MWF 9:40–12 am; Section 31: recitation WF 1:10–2:30 pm and laboratory MWF 3:10–5:30 pm.

2–11 Introduction to Modern Physics (4)
Topics focusing upon present understanding of the physical universe and character of the atomic and subatomic worlds. Includes considerations of length and time in relativity theory, present understanding of gravitation, wave-particle duality, quantum theory, nuclei, subnuclear particles. Prerequisite: Phys 1 or equivalent. Laboratory fee, $11. Second Session: lecture MTTh 1:10–3 pm. Section 32: recitation WF 8:10–9:30 am and laboratory MWF 9:40–12 am; Section 33: recitation WF 1:10–2:30 pm and laboratory MWF 3:10–5:30 pm.

299–300 **Thesis Research** (3–3)

First Session: Phys 299–10; Second Session: Phys 300–10.

399–10 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Political Science

H.L. LeBlanc, *Chairman*

Departmental prerequisite: PSc 4 and 6 or 5 and 6 are prerequisite to all second-group courses in Political Science.

5–11 **Introduction to Political Science** (3)

Introduction to the study of comparative political systems; emphasis on structures and processes of major foreign governments and the force of basic ideologies. Students who receive credit for PSc 5 cannot receive credit for PSc 4. Second Session: MTWThF 1:10–2:30 pm.

6–10 **Introduction to Political Science** (3)

Introduction to the study of the structure, powers, and processes of the American political system. First Session: MTWThF 11:10 am–12:30 pm.

101–10 **Far East in the Modern World** (3)

First Session: MTWThF 8:10–9:30 am (See Russian-East Asian Studies program, pages 43–44.)

103–11 **State Politics** (3)

Theory and practice of American federalism, factors influencing state policy choices, state responsiveness to urban problems. Second Session: MTWThF 4:10–5:30 pm.

104–10 **Urban Politics** (3)

Demographic trends and implications, local metropolitan political systems, issues in urban politics, strategies of political change. First Session: MTWThF 4:10–5:30 pm.

105–11 **Scope and Methods of Political Science** (3)

Nature of political inquiry, approaches to the study of politics and government, empirical methods of research. Prerequisite: Stat 51 or 53; or equivalent. Second Session: MTWThF 1:10–2:30 pm.

107–10 **Issues in Modern Political Thought** (3)

Issues of modern political thought as seen through major representative thinkers. Emphasis on conservative, liberal, and radical thought. First Session: MTWTh 5:45–7:25 pm.

111–11 **Comparative Government and Politics** (3)

Government and politics of the principal constitutional democracies of Western Europe. Second Session: MTWThF 9:40–11 am.

*112–11 **Comparative Government and Politics** (3)
Government and politics of the communist nations; emphasis on the Soviet Union and the countries of Eastern Europe. Second Session: MTWThF 1:10–2:30 pm.

118–11 **Political Theory: Major Issues of Western Political Thought** (3)
Philosophical roots of modern political order and disorder—Machiavelli to Rousseau. Second Session: MTWThF 11:10 am–12:30 pm.

121–10 **U.S. Constitutional Law and Politics** (3)
Separation of powers, federal-state relationships, economic regulation. First Session: MTWThF 9:40–11 am.

125–11 **Legislative Process** (3)
Study of Congress, including theories of representation, legislative power structure, selection of legislators and the roles they play, decision-making, and the relationship between the legislative and executive branches. Second Session: MTWThF 11:10 am–12:30 pm.

160–10 **Modern Communist Ideologies** (3)
First Session: MTWThF 4:10–5:30 pm. (See Russian-East Asian Studies program, pages 43–44.)

163–10 **Soviet Foreign Policy** (3)
First Session: MTWTh 5:45–7:25 pm. (See Russian-East Asian Studies program, pages 43–44.)

171–10 **International Politics** (3)
International actors, international and domestic environments of foreign policy, global and regional patterns, general characteristics of foreign policy. First Session: MTWThF 11:10 am–12:30 pm.

172–10 **International Organizations** (3)
Development and operations of the United Nations, regional organizations, and functional international organizations. First Session: MTWThF 1:10–2:30 pm.

178–11 **International Relations of Latin America** (3)
U.S.-Latin American relations, inter-American diplomacy and organization, foreign policies of selected states, the Cuban revolution. Second Session: MTWThF 4:10–5:30 pm.

179–10 **International Relations of the Middle East** (3)
Analysis of the regional and international relations of the Middle East. First Session: MTWThF 11:10 am–12:30 pm.

181–11 **Public International Law and Organization** (3)
Survey of international law; emphasis on development and trends. Second Session: MTWThF 4:10–5:30 pm.

190–10 **Politics of Middle and Southern Africa** (3)
Comparative analysis of the political systems of selected countries of non-Mediterranean Africa. First Session: MTWThF 4:10–5:30 pm.

---

* PSc 112 and 115 are related in their subject matter, and credit for only one may be applied toward a degree.

193–11 **Governments and Politics of South and Southeast Asia** (3)

Second Session: MTWThF 9:40–11 am. (See Russian-East Asian Studies program, pages 43–44.)

*194–10 **Governments of China and Japan** (3)

First Session: MTWThF 9:40–11 am. (See Russian-East Asian Studies program, pages 43–44.)

197–10 **Proseminar: International Affairs** (3 or 6)

Substantive problems of U.S. foreign policy. Readings, term papers, discussion. First Session: MTWThF 1:10–2:30 pm.

204–10 **Urban Politics** (3)

Readings and discussions on patterns and implications of urban growth, local and metropolitan political systems, policy formation and change, conflict management, political constraints on social reform. First Session: MWTh 6:10–8 pm.

207–10 **Empirical Political Analysis** (3)

Techniques of data gathering and analysis, the uses of data in political research. First Session: MWTh 6:10–8 pm.

211–11 **Comparative Government and Politics** (3)

Problems of comparative political analysis; a comprehensive examination of the literature in comparative politics. Second Session: MWTh 6:10–8 pm.

270–11 **Political and Social Institutions of Eastern Europe** (3)

Second Session: MWTh 3:10–5 p.m. (See Russian-East Asian Studies program, pages 43–44.)

275–10 **Theories of International Politics** (3)

Critical examination of contemporary theories, both empirical and normative. First Session: MWTh 6:10–8 pm.

276–11 **Topics in International Politics** (3)

Reading, research, and discussion of selected structural and procedural aspects of international political relations. Second Session: MWTh 6:10–8 pm.

For information concerning the special program in Russian-East Asian Studies, see pages 43–44.

sychology

D. Walk, *Chairman*

partmental prerequisite: Psyc 1 or 5 or 6 is prerequisite to all other courses Psychology. Six semester hours in Psychology courses are prerequisite to all cond-group courses in Psychology. The departmental prerequisite may be ived with the permission of the instructor.

Sc 162 and 194 are related in their subject matter, and credit for only one may be applied ard a degree.

Third-group courses are limited to graduate students in Psychology, except by special permission of instructor.

1 **General Psychology** (3)

Fundamental principles underlying human behavior. First Session: Section 10—MTWThF 1:10–2:30 pm; Second Session: Section 11—MTWThF 4:10–5:30 pm; Section 12—MTWThF 9:40–11 am.

5–11 **Principles and Methods of Psychology** (4)

Lecture (3 hours), laboratory (3 hours). An experimental approach to understanding behavior; individual and class experiments performed. Sensation, perception, and emotions and their relation to adaptive behavior. Laboratory fee, $6 a semester. Second Session: MWF 1:10–3:30 pm. Laboratory: TTh 1:10–4 pm.

8–10 **Psychology of Motivation and Personality** (3)

Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, and assessment and description of personality emphasized. First Session: MTWThF 9:40–11 am.

22–11 **Introduction to Educational Psychology** (3)

The contributions of psychology to education; emphasis on learning. Field work is required for all education majors. Second Session: MTWThF 1:10–2:30 pm.

29–10 **Psychology of Childhood** (3)

Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world. First Session: MTWThF 1:10–2:30 pm.

101 **Abnormal Psychology** (3)

Causes, diagnosis, treatment, and prevention of various types of maladjustments and mental disorders. Prerequisite: 6 semester hours in psychology, or 3 in psychology and 6 in a biological science. First Session: Section 10—MTWThF 9:40–11 am. Second Session: Section 11—MTWThF 8:10–9:30 am.

110–11 **Cognitive and Perceptual Development** (3)

Concepts and research in the area of developmental psychology; emphasis on the growth and development of perception, cognition, and language. Second Session: MTWThF 4:10–5:30 pm.

112–10 **Psychology of Adolescence** (3)

Psychological characteristics and problems peculiar to adolescence, with emphasis on application of psychology to solution of such problems. First Session: MTWThF 11:10 am–12:30 pm.

115–10 **Psychology of Language and Communication** (3)

Introduction to psycholinguistics and verbal behavior. Information theory, generative grammar theory, cultural and linguistic structures in the perception and learning of language. First Session: MTWThF 4:10–5:30 pm

117–11 **Psychology of Art and Picture Perception** (3)

Theories of Arnheim, Gibson, Gombrich, and Goodman as related to art and picture perception; study of cross-cultural research and research with children. Second Session: MTWThF 11:10 am–12:30 pm.

118–11 **Neuropsychology** (3)

Analysis of neural processes underlying behavior. Basic structure and functions of the nervous system; emphasis on sensory processes, learning and memory, motivation, and emotion. Second Session: MTWThF 1:10–2:30 pm.

121–10 **Psychology of Learning** (3)

Theories and issues related to basic learning processes as determinants of behavior. Emphasis on current research using both human and animal subjects. First Session: MTWThF 11:10 am–12:30 pm.

122–10 **Psychology and Human Relations** (3)

Understanding human relations and T-group techniques by evolving an ongoing T-group within the course itself. For junior and senior undergraduate social science majors; open to others with permission of instructor. First Session: MWTh 1:10–3 pm.

129 **Theories of Personality** (3)

Survey of personality theories; emphasis on their application to problems of individuals. First Session: Psyc 129–10; Second Session: Psyc 129–11. MTWThF 9:40–11 am.

131–11 **Psychological Tests** (3)

Survey of Psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $7. Second Session: MTWThF 11:10 am–12:30 pm.

132–10 **Socialization in Childhood** (3)

Examination of the primary methods by which the child is shaped in terms of social judgment and self control, internalization of control, assimilation of societal values and parenting procedures. Organized by focus on issues according to developmental level. First Session: MTWThF 1:10–2:30 pm.

144–10 **Personnel and Industrial Psychology** (3)

Psychological concepts and methods applied to problems of personnel management, human engineering, employee motivation, and productivity. Second Session: MTWThF 5:45–7:25 pm.

150–10 **Psychology of Sex Differences** (3)

Relevant biological, psychological, and sociological influences on males and females in the development of sex differences: hormonal differences, gender identity, differential socialization of sons and daughters, masculinity/feminity, cultural evaluation of male and female roles. Survey of relevant psychological theory. Emphasis on empirical research and hypothesis testing. Admission by permission of instructor. First Session: MTW ThF 11:10 am–12:30 pm.

151–11 **Social Psychology** (3)

Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war. Second Session: MTWThF 9:40–11 am.

154–10 **Psychological Criminality** (3)

Examination of many of the psychological aspects of criminal behavior; the personality of criminals, and of psychological processes affecting behavior. First Session: MTWThF 4:10–5:30 pm.

156–11 **Psychology of Attitudes and Public Opinion** (3)
Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare. Second Session: MT WTh 7:35–9:15 pm.

191 **Independent Research in Psychology** (3)
Opportunity for work on individual library or experimental projects. Open to qualified students by permission; arrangements must be made with the sponsoring faculty member prior to registration. May be repeated once for credit. First Session: Section 10; Second Session: Section 11.

196–10 **History and Systems of Psychology** (3)
Senior capstone course which includes a survey and integration of the major viewpoints and concepts of psychology. Required of Psychology majors. First Session: MTWThF 9:40–11 am.

211–10 **Assessment of Cognitive Functioning** (3)
Concepts of intelligence and achievement and their assessment through a variety of group and individual procedures. Material fee, $7. Admission by permission of instructor. First Session: MWF 4:10–6 pm.

212–10 **Personality Assessment by Projective Techniques** (3)
Methods of personality assessment, including psychometric and projective tests. Material fee, $7. Admission by permission of instructor. First Session: MWF 6:10–8 pm.

215–10 **Personality Assessment by Multiple Procedures** (3)
Consideration and use of a wide range of procedures in assessment of personality and psychopathology of children. Prerequisite: Psyc 207–8 or 211 and 212. Graduate students in fields other than Psychology admitted by permission of instructor. Material fee, $7. First Session: MWTh 6:10–8 pm.

246–10 **Seminar: Personnel Measurement Techniques** (3)
Detailed consideration of techniques of personnel selection and performance evaluation. Employment tests, personal data, assessment interviews, and performance ratings. First Session: MWTh 5:45–7:25 pm.

272–10 **Seminar: Theories of Personality** (3)
Emphasis on theoretical problems and methodology in the field of personality study. First Session: MWTh 3:10–5 pm.

289–11 **Seminar: Current Topics in Experimental Psychology** (3)
Review and discussion of contemporary research and theory in a specialized field of psychological study, by leaders in the field. Independent topics each time the course is offered; may be repeated for credit. Second Session: As arranged.

295 **Independent Research in Psychology** (3)
Individual library or experimental research under supervision of staff member. Arrangements must be made with sponsoring faculty member prior to registration. May be repeated once for credit. First Session: Section 10; Second Session: Section 11.

299–300 **Thesis Research** (3–3)
Psyc 299–10 and 300–10: both sessions.

398–10 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy comprehensive examinations. May be repeated for credit. Both sessions.

399–10 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

ublic Administration

S. Brown, *Chairman*

210–11 **Concepts and Issues in Public Administration** (3)

Introduction to graduate study in Public Administration. Professionalism and the public service. Nature of public interests; multiplicity of organizational objectives. Administrative responsibility and individual and organizational ethics. Individual goals and career planning. Second Session: TTh 6:10–9 pm.

213–10 **Administration in the Federal Government** (3)
(Formerly Administration in Government)

Critical analysis of federal administrative organizations as an integral part of the political system. Roles of Congress, the President, the courts, interest groups, political parties, and the public in the public decisional process; special attention to centripetal and centrifugal forces. First Session: MWTh 6:10–8 pm.

220–11 **Law and the Public Administrator** (3)
(Formerly Law, Responsibility, and the Public Administrator)

Exploration and analysis of the functions of law in a democratic society. Emphasis is placed upon the procedural, historical, and jurisprudential dimensions of American law. This broad perspective seeks to convey a more perceptive understanding of the law as a legal and moral force guiding and constraining public decision making. Second Session: MW 6:10–9 pm.

246–10 **Dynamics of Citizen Participation in Administration** (3)

Examination of the nature of participation in a democratic society. An analysis of the characteristics and dynamics of citizen-based organizations. Exploration of effective methods or models by which administrators may utilize citizen participation. First Session: MW 6:10–9 pm.

250–10 **Administration of State and Local Governments** (3)
(Formerly Administration of Metropolitan Area Governments II)

Examination of metropolitan governmental structures and functions, public and private demands, their place within the federal system, their limitations, and alternatives available to encourage more effective administration. First Session: TTh 6:10–9 pm.

323–11 **Behavioral Factors in Large Organizations** (3)

Analysis of the nature and characteristics of bureaucracy; dysfunctionalism; approaches to policy guidance and leadership, particularly in large public organizations; influence and control systems. Second Session: TTh 6:10–9 pm.

Religion

R.G. Jones, *Chairman*

59–60 **History of Religions** (3–3)
Origins, evolution, and contemporary status in historical context. Rel 59: primitive religion and the religions of the East (Hinduism, Buddhism, Taoism, Confucianism, Shinto). Rel 60: religions of the West and Near East (ancient religions, Judaism, Christianity, Islam). First Session: Rel 60–10; Second Session: Rel 59–11. MTWThF 11:10 am–12:30 pm.

137–10 **The Land of Israel and the Growth of the Western Religions** (6)
(See Summer Institute in Israel, page 46.)

162–11 **Symbolism in the History of Religions** (3)
Religious symbolism, myth, legend, and ritual in the religions of the world; various theoretical analyses. Second Session: MTWTh 5:45–7:25 pm.

172–10 **Religion in American Culture** (3)
Growth of religious bodies and institutions in relation to American culture, development of religious thought, and analysis of the contemporary religious scene. First Session: MTWTh 5:45–7:25 pm.

291–92 **Readings and Research** (3–3)
Investigation of special problems. First Session: Rel 291–10; Second Session: Rel 292–11.

299–300 **Thesis Research** (3–3)
Rel 299–10 and 300–10: both sessions.

For information concerning the Summer Institute in Israel, see page 46.

Russian

See "Slavic Languages and Literatures."

Slavic Languages and Literatures

G.A. Olkhovsky, *Chairman*

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

5–6 **Intensive Beginning Russian** (6–6)

Beginners' intensive course in the fundamentals of Russian. Prerequisite to Slav 6: Slav 2 or 5. Laboratory fee, $17.50 a session. First Session: Slav 5–10; Second Session: Slav 6–11. Classroom—MTWThF 9:30–11:30 am and 12:30–2:30 pm, laboratory—TTh 3:10–4 pm.

47–10 **Beginning Russian for Reading** (3)

For students with little or no knowledge of Russian who wish to learn to read the language only. Credit assigned only after completion of Slav 49. No academic credit for graduate students. First Session: MTWTh 5:45–7:25 pm.

49–11 **Russian Reading** (3)

Primarily for graduate students preparing for reading examinations in the natural and social sciences. No academic credit for graduate students. Prerequisite: Slav 47 or equivalent. Second Session: MTWTh 5:45–7:25 pm.

91–92 **Introduction to Russian Literature** (3–3)

Emergence and development of Russian literature and ideas from earliest times to the early 20th century—in English. First Session: Slav 91–10; Second Session: Slav 92–11. MTWTh 7:35–9:15 pm.

ɔciology

F. Courtless, *Chairman*

partmental prerequisite: Soc 1 is prerequisite to all second- and third-group urses in Sociology except for Soc 181 and 191.

1 **Introductory Sociology** (3)

General principles of sociology; development of culture and personality, impact of groups and institutions on man's social behavior. First Session: Section 10—MTWThF 8:10–9:30 am. Second Session: Section 11—MTWThF 4:10–5:30 pm.

2–11 **Uses of Sociology** (3)

Introduction to the various methods by which sociologists have approached the investigation of social phenomena. Prerequisite: Soc 1. Second Session: MTWThF 8:10–9:30 am.

124–10 **Medical Sociology** (3)

Social factors and processes related to the etiology and treatment of physical and mental illness; medical occupations and professions, medical organizations, problems of delivery of health care services. First Session: MTWThF 9:40–11 am.

126–10 **Urban Sociology** (3)

Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburban development. First Session: MTWThF 6–7:20 pm.

129–10 **Race and Minority Groups** (3)
Analysis of relationships between dominant and minority groups in society, particularly in the United States; nature and range of problems; analysis of the phenomenon of prejudice. First Session: MTWThF 4:10–5:30 pm.

135–10 **Juvenile Delinquency** (3)
Factors producing delinquency, juvenile detention, the juvenile court, training schools, treatment of offenders. First Session: MTWThF 11:10 am–12:30 pm.

137–10 **Sociology of Law** (3)
Law as a social phenomenon and agency of social control. Problems of legal concepts, doctrines, and institutions. Prerequisite: Soc 136. First Session: MTWThF 8:10–9:30 am

139–10 **Society and the Deviant** (3)
Analysis of relationships of society, socialization, and deviancy. Social responses to deviancy and criminal offenders; rehabilitative programs in community, courts, and schools. First Session: MTWThF 1:10–2:30 pm.

141–11 **Social Research Methods** (3)
Introduction to scientific method in the development of social theory and the solution to social problems. Prerequisite: Stat 53. Second Session: MTWThF 9:40–11 am.

191–11 **Current Emphases in Sociology** (3)
Topic for Summer: Sociology of Women. Second Session: MTWThF 4:10–5:30 pm.

195 **Research** (3)
Independent study and special projects. Open only to selected undergraduate students with promising academic records. Before a student is permitted to register for Soc 195, he must submit a written proposal of his plan of study for the approval of the staff member of the Department who will be directing his research. First Session: Section 10; Second Session: Section 11.

203–11 **Social Organization** (3)
Introduction to sociological concepts and perspectives on society as a system of institutions. Recommended for students offering sociology as a supporting field. Second Session: TWTh 6:10–8 pm.

295 **Research** (arr.)
Independent study and special projects. Before a student is permitted to register for Soc 295, he must submit a written proposal of his plan of study for the approval of the staff member of the Department who will be directing his research. May be repeated once for credit. First Session: Section 10; Second Session: Section 11.

299–300 **Thesis Research** (3–3)
Soc 299–10 and 300–10: both sessions.

352–11 **Selected Topics in Sociology** (3)
Sociological Theory: study of important theorists such as Marx, Weber, Parsons; important themes such as social change, social control; important schools such as symbolic interactionism, general systems theory. Second Session: MWTh 6:10–8 pm.

398–10 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399–10 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Spanish

Administered by the Department of Romance Languages and Literatures, J.F. Burks, *Chairman*

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

Departmental prerequisite: Span 3–4 or 6, or equivalent, is prerequisite to all second-group courses in Spanish.

1–2 **First-year Spanish** (3–3)
A year course: credit toward a degree at this University given on completion of Span 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Spanish prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a session. First Session: Span 1–10; Second Session: Span 2–11. Classroom—MTWThF 8:10–9:30 am, laboratory—MTh 10:10–11 am.

3–4 **Second-year Spanish** (3–3)
A year course: credit toward a degree at this University given on completion of Span 4. Conversation, grammar, composition, reading of modern Spanish prose, introduction to Hispanic civilization. Aural training, oral practice in language laboratory. Prerequisite: Span 1–2 or two years of high school Spanish. Laboratory fee, $17.50 a session. First Session: Span 3–10; Second Session: Span 4–11. Classroom—MTWThF 11:10 am–12:30 pm, laboratory—MTh 9:10–10 am.

9–10 **Spanish Conversation and Composition** (3–3)
Prerequisite: Span 4 or equivalent and permission of instructor. Students who receive credit for Span 9 cannot receive credit for Span 19. First Session: Span 9–10—MTWThF 11:10 am–12:30 pm; Second Session: Span 10–11—MTWThF 9:40–11 am.

130–10 **The Modern Spanish Essay** (3)
Development of the Spanish essay from the 16th century; emphasis on the 18th and 19th centuries. Class analysis of texts, collateral reading, and lectures. First Session: MTWThF 9:40–11 am.

143–10 **Seminar: Spanish American Literature** (6)
Topic for the Summer: Highlights of the Spanish American short story, from the late 19th century through the 20th century. Daily analyses of texts. May be repeated for credit. First Session: MTWThF 9:40–11 am.

299–10 **Thesis Research** (3)
First Session. As arranged.

Special Education

Perry Botwin, *Chairman*

NINE-WEEK COURSES—JUNE 16 TO AUGUST 15

262–10 **Seminar: the Education of Young Exceptional Children** (3)

Seminar dealing with experiences, problems, and concerns encountered during the internship for the education of young exceptional children. Must be taken concurrently with SpEd 292–10. Admission by permission of instructor. As arranged.

292–10 **Professional Internship in the Education of Young Exceptional Children** (6)

Supervised internship in the education of young exceptional children. Must be taken concurrently with SpEd 262–10. A minimum of 210 clock hours required. As arranged.

294–10 **Practicum in Diagnostic-Prescriptive Teaching** (9)

Supervised field experience in diagnostic-prescriptive teacher programs. Admission by permission of instructor. As arranged.

FIRST 3-WEEK EDUCATION WORKSHOP SESSION—JUNE 16 TO JULY 3

Classes meet Monday through Friday. Concurrent registration for another 3-week workshop course is not permitted. June 16 to 20—small group discussions, evening; June 23 to July 3—small group discussions and field work, afternoon.

201–10 **Introduction to Special Education** (3)

Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommodate children in a school program. June 16 to 20: lecture 3:45–6:45 pm. June 23 to July 3: 9:10–12 am.

251–10 **Psychosocial Factors in Special Education** (3)

Psychological factors significant to the process of the special education school based consultant. Admission by permission of instructor. June 16 to 20: lecture 3:45–6:45 pm. June 23 to July 3: lecture 9:10–12 am.

269–10 **Psychosocial Concerns of the Early Childhood Special Educator** (3)

Seminar involving student presentations focusing on sociological and psychological constructs relevant to interpersonal/intrapersonal relationships. Lecture 6:10–9 pm.

297–10 **Individual Study in Special Education** (3)

Individual study or research under guidance of staff member. Program and conferences arranged with adviser. Admission by permission of adviser. As arranged.

453–10 **Doctoral Internship: Special Education** (6)

Supervised professional internship in college teaching, administration, supervision, or private agency function. Each internship individually arranged. Admission by permission of adviser. As arranged.

491–10 **Dissertation Research** (3 or 6)

ECOND 3-WEEK EDUCATION WORKSHOP SESSION—JULY 7 TO JULY 25

Classes meet Monday through Friday. Concurrent registration for another 3-week workshop course is not permitted.

170–11 **Interpersonal/Intrapersonal Relationships for Special Education Teachers** (3)

Consideration of factors leading to successful interaction with children. Lecture 9:10–12 am.

240–11 **The Crisis-Resource Teacher** (3)

Rationales, operational models, techniques, and problems relevant to the implementation of crisis-resource teacher programs. Lecture 9:10–12 am.

265–11 **Clinical Experience with Multiply Handicapped and Developmentally Disabled Young Children** (3)

A 3-week intensive field experience in an early childhood special education setting for students with no experience in this area. Supervised experience necessary for program articulation. Required for degree candidates in the specialization area of early childhood special education. Lecture 9:10–12 am.

268–11 **The Development of Young Exceptional Children with Emphasis on Handicapping Conditions** (3)

Lecture, site visitation, discussion. Lecture 6:10–9 pm.

297–11 **Individual Study in Special Education** (3)

Individual study or research under guidance of staff member. Program and conferences arranged with adviser. Admission by permission of adviser. As arranged.

370–11 **Intrapersonal Dynamics in Special Education** (3)

Small group exploration of intrapersonal factors essential to understanding roles and interpersonal techniques in teaching exceptional children. Admission by permission of instructor. Lecture 1:10–4 pm.

453–11 **Doctoral Internship: Special Education** (6)

Supervised professional internship in college teaching, administration, supervision, or private agency function. Each internship individually arranged. Admission by permission of adviser. As arranged.

491–10 **Dissertation Research** (3–6)

IRD 3-WEEK EDUCATION WORKSHOP SESSION—JULY 28 TO AUGUST 15

asses meet Monday through Friday. Concurrent registration for another 3-ek workshop course is not permitted.

260–12 **The Assessment Process: Identification and Psycho-educational Assessment of Young Exceptional Children** (3)

Lectures, demonstrations, and clinical practice in formal and informal assessment procedures. Admission by permission of instructor. Lecture 9:10–12 am.

266–12 **Problems in Language Development in Young Exceptional Children** (3)

Introduction to the study of language acquisition and the application of current research on language of handicapped children. Lecture 6:10–9 pm.

298–12 **Individual Study in Special Education** (3)

Individual study or research under guidance of staff members. Program and conferences arranged with adviser. Admission by permission of adviser. As arranged.

453–12 **Doctoral Internship: Special Education** (6)

Supervised professional internship in college teaching, administration, supervision, or private agency function. Each internship individually arranged. Admission by permission of adviser. As arranged.

491–10 **Dissertation Research** (3–6)

Speech and Drama

Lloyd S. Bowling, *Chairman*

1 **Communicative Speaking and Listening** (3)

Basic theories and principles of speech communication; composition, delivery, and criticism of speaking in interpersonal, group, and public situations. Recording fee, $4. First Session: Section 10—MTWThF 11:10 am–12:30 pm. Second Session: Section 11—MTWThF 1:10–2:30 pm.

11–10 **Voice and Diction** (3)

Development of naturalness, correctness, and clarity in conversational speech. Analysis and correction of individual speech delivery faults through tapes and weekly performances. Recording fee, $4. First Session: MTWThF 9:40–11 am.

45–11 **Understanding the Theatre** (3)

The art of the theatre; its literature, aesthetics, and mechanics. Contributions of the playwright, actor, director, and designer examined through lectures, visiting artists, class discussions, and attendance at theatrical performances. Primarily for nonmajors. Second Session: MTWThF 9:40–11 am.

106–10 **Introduction to Audiology** (3)

June 11 to July 9: MTWTh 11:10 am–12:50 pm. (See Summer Institutes in Speech Pathology and Audiology, pages 46–47.)

115–11 **Acting** (3)

Fundamentals of character analysis and development; stage speech and movement, audition techniques. Second Session: MTWTh 11:10 am–12:55 pm.

121–10 **Group Discussion and Conference Leadership** (3)

Process of thinking and problem-solving in communities and small groups; methods of leading discussions and conferences. Prerequisite: SPDR 1 or permission of instructor. First Session: MTWThF 1:10–2:30 pm.

126–11 **Argumentation and Debate** (3)

Study of the advocacy system; special emphasis on issue identification, use of evidence, and logical proof. Extensive practice in argumentative speaking. Prerequisite: SPDR 1 or permission of instructor. Second Session: MTWThF 9:40–11 am.

133–10 **Broadcasting in America** (3)

Study of the origins, structure, and nature of American broadcasting with emphasis on the communicative factors and effects of television programming. First Session: MTWTh 5:45–7:25 pm.

145–10 **Television Production and Performance** (3)

Television production techniques, skills, programming, directing, scriptwriting, and other aspects of television production. Extensive practice in working television equipment with emphasis on in-studio projects. Recording fee, $5. First Session: MTWThF 1:10–2:30 pm.

151–10 **Stagecraft** (3)

Lecture (2 hours), laboratory (1 hour). Theories and practicum in the technical aspects of production. First Session: MTWTh 5:45–7:25 pm.

155–56 **Play Production Practice** (1–1)

Practical work in theatre: assigned production duties in one of the following areas: scenery, costuming, lighting/sound, properties, public relations, acting. May be repeated for a total of 4 semester hours of credit, but a different area must be elected at each registration. First Session: SPDR 155–10; Second Session: SPDR 156–11. As arranged.

*192–10 **The American Cinema** (3)

First Session: MW 6–10 pm. (See The American Cinema, page 38.)

196–10 **Independent Study** (1–3)

Independent research and special projects. Open only to undergraduate students in their senior year. Before a student is permitted to register for SPDR 196, he must submit a written proposal of his plan of study and obtain approval of the staff member who will be directing the study as well as of the Departmental Chairman.

268 **Clinical Practice in Communication Disorders** (1)

Supervised clinical practice in the evaluation and treatment of communication disorders. May be repeated for a total of 3 semester hours of credit. First Session: Section 10; Second Session: Section 11. As arranged.

273–11 **Treatment of Speech Articulation Disorders** (2)
(Formerly Articulation Disorders III)

Continuation of SPDR 272. Laboratory fee, $5. July 10–August 7: MTWTh 9:20–11 am. (See Summer Institutes in Speech Pathology and Audiology, pages 46–47.)

276–11 **Treatment of Fluency Disorders in Children** (2)
(Formerly Fluency Disorders III)

Continuation of SPDR 275. Laboratory fee, $5. July 10 to August 7: MTWTh 11:10 am–12:50 pm. (See Summer Institutes in Speech Pathology and Audiology, pages 46–47.)

*Joint offering of the Department of Speech and Drama and the American Studies Program. Students may register under either designation.

279–10 **Clinical Treatment of Language Disorders in Children** (3)
(Formerly Language Disorders III)
June 11 to July 9: MTWTh 9:20–11 am. Laboratory fee, $7.50. (See Summer Institutes in Speech Pathology and Audiology, page 46–47.)

282–11 **Organic Voice Disorders** (2)
(Formerly Voice Disorders III)
Continuation of SPDR 281. Laboratory fee, $5. July 10–August 7: MTWTh 1–2:40 pm. (See Summer Institutes in Speech Pathology and Audiology, pages 46–47.)

290–10 **Management of the Hearing-impaired Child** (3)
June 11 to July 9: MTWTh 1–2:40 pm. (See Summer Institutes in Speech Pathology and Audiology, pages 46–47.)

294 **Independent Research in Dramatic Art** (arr.)
May be repeated for credit. First Session: Section 10; Second Session: Section 11.

295 **Independent Research in Speech and Hearing** (arr.)
May be repeated for credit. First Session: Section 10; Second Session: Section 11.

299–300 **Thesis Research** (3–3)
SPDR 299–10 and 300–10: both sessions.

For information concerning the American Cinema since 1950 program and the Summer Institutes in Speech Patholoy and Audiology, see pages 46–47.

Statistics

Jerome Cornfield, *Chairman*

Departmental prerequisite: one entrance unit in algebra is prerequisite to all first-group courses in Statistics.

Stat 51, 53, and 91 are related in their subject matter, and credit hours for only one of the three may be applied toward a degree.

51–11 **Introduction to Business and Economic Statistics** (3)
Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $18. Second Session: lecture MTWThF 11:10 am–12:30 pm, laboratory as arranged.

53–10 **Introduction to Statistics in Social Science** (3)
Frequency distributions, descriptive measures, probability, sampling, esti-

mation, tests of hypotheses, correlation, analysis of variance. Laboratory fee, $18. First Session: lecture MTWTh 4:10–5:30 pm, laboratory TTh 5:40–6:30 pm.

91–10 **Principles of Statistical Methods** (3)

Variables and attributes, averages and dispersion, frequency distributions and their characteristics, regression and correlation, statistical decision processes. Laboratory fee, $18. First Session: lecture MTWThF 1:10–2:30 pm, laboratory as arranged.

111–10 **Business and Economic Statistics I** (3)

Statistical processes as tools in decision-making in areas of economics and business. Admission by permission of instructor. First Session: MT WTh 4:10–5:40 pm.

112–11 **Business and Economic Statistics II** (3)

Case work to illustrate quantitative procedures for solution of economic and business problems. Prerequisite: Stat 111 or equivalent. Second Session: MTWTh 4:10–5:40 pm.

117–11 **Analysis of Variance** (3)

Introduction to the design of experiments and analysis of variance; random block, factorial, Latin square, and analysis of covariance. Prerequisite: Stat 118. Laboratory fee, $18. Second Session: lecture as arranged; laboratory as arranged.

118–10 **Regression Analysis** (3)

Regression and correlation theory; simple, partial, and multiple. Prerequisite: 3 semester hours selected from Stat 51, 53, 91, 107. Laboratory fee, $18. First Session: lecture MWF 5:10–7 pm, laboratory as arranged.

159–11 **Principles of Bayesian Statistics** (3)

Probability as a measure of uncertainty of knowledge; concepts and techniques of Bayesian inference. Prerequisite: 3 semester hours in introductory statistics, or equivalent. Second Session: MTWTh 7:35–9:15 pm.

201–2 **Mathematical Statistics** (3–3)

Distribution theory, sampling theory, estimation, sufficient statistics, hypothesis testing, analysis of variance, multivariate normal distribution. Prerequisite: advanced calculus. First Session: Stat 201–10; Second Session: Stat 202–11. MTWTh 5:45–7:25 pm.

206–10 **Factor Analysis** (3)

Concepts of factor analysis and their utility in various phases of research and related topics, including cluster analysis. Prerequisite: Stat 105 or equivalent and permission of instructor. Laboratory fee, $18. First Session: MTW 6:10–8 pm.

299–300 **Thesis Research** (3–3)

Stat 299–10 and 300–10: both sessions.

399–10 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Urban and Regional Planning

D.C. McGrath, Jr., *Chairman*

201–10 **Introduction to Urban Planning** (3)

Introduction to history, concepts, and activities of urban planning. Discussion of trends in urbanism and the influences of technical and social change. First Session: TTh 6:10–9 pm.

205–11 **Urban Housing** (3)

Examination of the housing problem: housing market characteristics, analytical techniques, national needs, costs, financing, federal programs, technology, rehabilitation, and policy formulation. Prerequisite: U&RP 201. Second Session: MW 6:10–9 pm.

207–11 **Land Development Planning** (3)

Selected problems in urban and regional planning: applications of zoning, urban renewal, and special programs available for the implementation of development plans. Prerequisite: U&RP 201 or permission of instructor. Second Session: TTh 6:10–9 pm.

213–10 **Social Factors in Urban Planning** (3)

Consideration of the impact of social groups, social class, and social institutions in urban structure; the development of techniques for reflecting social variables in the planning process. Prerequisite: U&RP 201 or permission of instructor. First Session: MW 6:10–9 pm.

290 **Special Topics in Urban and Regional Planning** (3)

An experimental course enabling the Department to develop new course topics and test new teaching methods. May be repeated once for credit. First Session: Section 10; Second Session: Section 11. As arranged.

295 **Research Methods** (3)
(Formerly Urban Research)

Directed research and investigation of special problems in community development. May be repeated once for credit. First Session: Section 10; Second Session: Section 11.

299–10 **Thesis Seminar** (3)

Both sessions: As arranged.

300–10 **Thesis Research** (3)

Both sessions.

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

HE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject change in connection with the establishment of judicial processes. Bulletins nd handbooks incorporating any changes will be issued as appropriate.

he following resolution, submitted by the University Senate, was approved by the niversity's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, nd indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of ee speech and freedom of assembly, and to safeguarding the right of lawful otest on campus; and is committed equally to maintaining the peace and fety of the campus, in the knowledge that all rights are in jeopardy when olence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington Uni-rsity: that in the event a demonstration at this University exceeds the bounds free assembly and lawful advocacy, and demonstrators are engaging in un-wful acts which cause or imminently threaten injury to person or property, or ich obstruct or interfere with normal and necessary University activities, this dy affirms the authority of the President, or other University officials desig-ed to act in his absence, to take such reasonable steps, if possible after con-tation with the Chairman of the Executive Committee of the University nate* and the President of the Student Body, as are required to restore and serve order; including, if deemed necessary and appropriate, suspension of dents or faculty engaging in such acts, and use of such law enforcement per-nel as are needed to effect the removal, arrest, and prosecution of law vio-rs. Any such suspension shall be reviewed by an appropriate tribunal as n after order is restored as is practicably possible.

following was approved by the University's Board of Trustees on October 19, 8:

ny student suspended from The George Washington University on the nds of exceeding the bounds of free assembly and lawful advocacy shall e his suspension reviewed by the Hearing Committee on Student Affairs† The George Washington University as soon after order is restored as is ticably possible.

University Senate has been renamed the Faculty Senate.

† duties and functions of the Hearing Committee on Student Affairs are now performed by the nt-Faculty Committee on Appeals.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968*:

The George Washington University is opposed to discrimination based on race, color, creed, sex, or national origin. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

* Amended January 18, 1973.

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.*

*The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and should be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the College

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE AND HEALTH SCIENCES, Admissions Office, School of Medicine and Health Sciences

SUMMER SESSIONS CATALOGUE, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

INDEX

A

Abbreviations, courses, 49
Academic credit, 20
Academic status of the University, 8
Academic work load, 20–21
Accounting courses, 49–51
Accreditation, 8
Administration, officers of, 11–13
Admission, 14–16
Admission tests, 16, 26, 27, 31, 32, 33, 34, 35
Alumni career services, 24, 25
American cinema, special program, 38
American Civilization courses, 51–52
American College Testing program, 16
American Literature courses, 76–77
Anthropology courses, 52–53
Application for admission or readmission, 14–15, 18
Application for graduation, 5, 17
Application forms, 5, 15
Applied Science courses, 70, 71
Archaeology, field research in, 41, 42
Art courses, 54–58
Art Therapy courses, 58
Auditing courses, 17, 19

B

Biological Sciences courses, 59–60
Board of Trustees, 10–11
Business Administration courses, 60–63

C

Calendar for summer 1974, 5–6
Capital City historical seminar, 39
Career services, student and alumni, 24–25
Changes in program of study, 17
Chemistry courses, 63–64
Classics courses, 64
Boyd Heck Marvin Center, 24
College Entrance Examination Board tests, 16, 27, 31, 34
Colleges, schools, and divisions of the University, 8, 26–37
Columbian College of Arts and Sciences, 8, 14, 26–28
Consortium of Universities of the Washington Metropolitan Area, Inc., 9
Consortium registration, 17
Counseling Center, 23
Course abbreviations, 49
Course numbers, explanation of, 48
Courses of instruction, 48–113
Credit, academic, 20
Credit, explanation of amount of, 49

D

Dance workshop, 39
Degree candidacy, admission to, 14–15, 16
Degree programs, off-campus, 36–37
Degrees offered by:
  Columbian College of Arts and Sciences, 27
  Graduate School of Arts and Sciences, 28–29
  National Law Center, 30
  School of Education, 32
  School of Engineering and Applied Science, 30–31
  School of Government and Business Administration, 33–34
  School of Public and International Affairs, 35
Dismissal of students, 21, 114–116
Dormitory, 24
Drama courses, 109–111

E

Economics courses, 64–66
Education courses, 66–70
Education, School of, 8, 14, 19, 32–33
Educational facilities of the University, 9
Electrical Engineering courses, 71–72
Employment, student, 24–25
Engineering Administration courses, 72–73
Engineering and Applied Science courses, 70–74
Engineering and Applied Science, School of, 8, 14, 19, 30–32
English courses, 75–77
Entrance requirements, 26–27, 28, 31–32, 32–33, 34–35, 35, 36
Examinations:
  American College Testing program, 16
  College Entrance Board, 16, 27, 31, 34
  For admission, 16, 27, 31, 32, 33, 34
  Graduate Record, 16, 31, 33, 34
  Graduate Study in Business, 16, 34
  Miller Analogies Test, 16, 32, 33
  National Teacher, 6, 18
Experimental Humanities courses, 77
Experimental Programs, Division of, 8, 36–37

F

Fees, 17–18
  Counseling Center, 23
  Payment of, 19
  Reading Center, 22–23
  Residence Hall rates, 24
  Right to change, 21
  Speech and Hearing Clinic, 23
  University Center, 18
Field program in Pre-Columbian Cultural Ecology, 40–41
Field research in historical archaeology, 41–42
Financial regulations, 19–20
Forensic Sciences courses, 77–78
French courses, 78–79

G

General Studies, College of, 8, 36–37
Geography and Regional Science courses, 79–80
Geology courses, 80–81
Germanic Languages and Literatures courses, 81
Government and Business Administration, School of, 8, 14, 33–35
Graduate fields of study:
  Arts and Sciences, 28–30
  Government and Business Administration, 33–34
  Public and International Affairs, 35
Graduate Record Examination, 16, 31, 33, 34
Graduate School of Arts and Sciences, 8, 14, 28–30
Graduate Study in Business, Admission Test, 16, 34
Graduation:
  Application for, 5, 17
  Fees, 18

H

Health Care Administration courses, 82–83
Health Care Sciences courses, 83
Health Service, Student, 22
Historical archaeology, field research in, 41–42
History courses, 83–85
History of the University, 7–8
Honorary Trustees, 11
Honors program, secondary school, 45
Human Kinetics and Leisure Studies courses, 85–86

I

Institute for Sino-Soviet Studies, 43–45
Institute in Israel, 45–46
Institutes in speech pathology and audiology, 46–47
Israel, summer institute in, 45–46

J

Journalism courses, 86–87

L

Law, *see* National Law Center
Library, 9
Location of the University, 8
Lost and found office, 21

M

Major fields, undergraduate:
  Columbian College of Arts and Sciences, 27–28
  School of Engineering and Applied Science, 30
  School of Government and Business Administration, 33–34
  School of Public and International Affairs, 35
Management Science courses, 87–89
Marvin Center, 24
Mathematics courses, 89–91
Mechanical Engineering course, 73–74
Medicine and Health Sciences, School of, 8, 14
Miller Analogies Test, 16, 32, 33
Movement education workshop, 42
Music courses, 92–94

N

National Law Center, 8, 14, 16, 20, 30, 87
National Teacher Examinations, 6, 18
New Journalism, special program, 42–43
Nondegree status admission to, 14, 15
Numbering of courses, explanations of, 48

O

Officers of Administration, 11–13
Operations Research courses, 74

P

Payment of fees, 19
Philosophy courses, 94–95
Physical Education, Health, and Recreation courses, 85–86
Physics courses, 95
Policy on release of student information, 21
Political Science courses, 95–98
Pre-Columbian cultural ecology, field program in, 40–41
Program of study, changes in, 17
Programs, right to change, 21
Psychology courses, 98–101
Public Administration courses, 101–102
Public and International Affairs, School of, 8, 14, 35

R

Reading Center, 22–23
Readmission, 14–15
Recently established regulations, 114–116
Recreational program, 25
Refunds, 19–20
Registration, 16–17
Regulations, 20–21, 114–116
Release of student information, policy on, 21
Religion courses, 102–103
Requirements, right to change, 21
Research facilities of Washington, 9
Residence, 20
Residence hall, 24
Rules, right to change, 21
Russian courses, 103–104
Russian-East Asian studies, 43–44

S

Secondary school honors program, 45
Semester hours of credit, 49
Service-Learning Experimental Humanities course, 77
Sino-Soviet Studies, Institute for, 43–44
Slavic Languages and Literatures courses, 103–104
Social program, 25
Sociology courses, 104–105
Spanish courses, 105–106
Special Education courses, 106–109
Special Programs and workshops, 38–47
Speech and Hearing Clinic, 23
Speech courses, 109–111
Speech pathology and audiology, summer institutes in, 46–47
Statistics courses, 111–112
Student career services, 24–25
Student Health Service, 22
Student services and activities, 22–25

T

Trustees, Board of, 10–11
Tuition, 17

U

University Center fee, 18
University Students, Division of, 8, 14, 15, 36
Urban and Regional Planning courses, 112–113

V

Veterans education, 23–24

W

Withdrawal, 19–20
Work load, academic, 20–21
Workshops, 39, 42

3/75—Cornelius—19M250

Students registered at George Washington University during the spring semester 1975 should not apply for admission to the Summer Sessions, but should report on June 2 to Building K, 817 23rd Street, N.W., where detailed information and the necessary registration materials will be provided.

REQUEST FOR APPLICATION FOR ADMISSION TO 1975 SUMMER SESSIONS

I am a ☐ student at another college wishing to earn credit for transfer.

I am a ☐ new student or former GWU student (prior to the 1975 Spring Semester) wishing to be admitted or readmitted to

- ☐ Nondegree status at GWU
- ☐ Bachelor's degree program
- Graduate degree program in:
  - ☐ Arts & Sciences
  - ☐ Education
  - ☐ Engineering & Applied Science
  - ☐ Government & Business Administration
  - ☐ Public & International Affairs
- National Law Center
  - ☐ J.D. program
  - ☐ Post-J.D. program

Mail application form to:

_____
Name

_____
No. Street

_____
City State Zip Code

Place a
Stamp Here

DEAN OF THE SUMMER SESSIONS
GEORGE WASHINGTON UNIVERSITY
WASHINGTON, D. C. 20052

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart. Sc.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.Forens.S.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers), Master of Science in Forensic Sciences (M.S. in Forens.S.), Master of Science in Special Studies (M.S. in Sp.Std.), and Doctor of Philosophy (Ph.D.)

SCHOOL OF MEDICINE AND HEALTH SCIENCES: Associate in Science (A.S.), Bachelor of Science in Allied Health Science (B.S. in A.H.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Science in Medical Technology (B.S. in Med.Tech.), and Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L. (Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Engineering Administration (M.E.A.), Master of Science (M.S.), and Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor of Science in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master of Arts in Education (M.A. in Ed.), Master of Arts in Teaching (M.A.T.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A.), Bachelor of Science in Administration (B.S. in Adm.), Bachelor of Science in Health Care Administration (B.S. in H.C.A.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), Master of Arts (M.A.), Master of Arts in International Affairs (M.S.I.A.)

THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, D. C. 20052